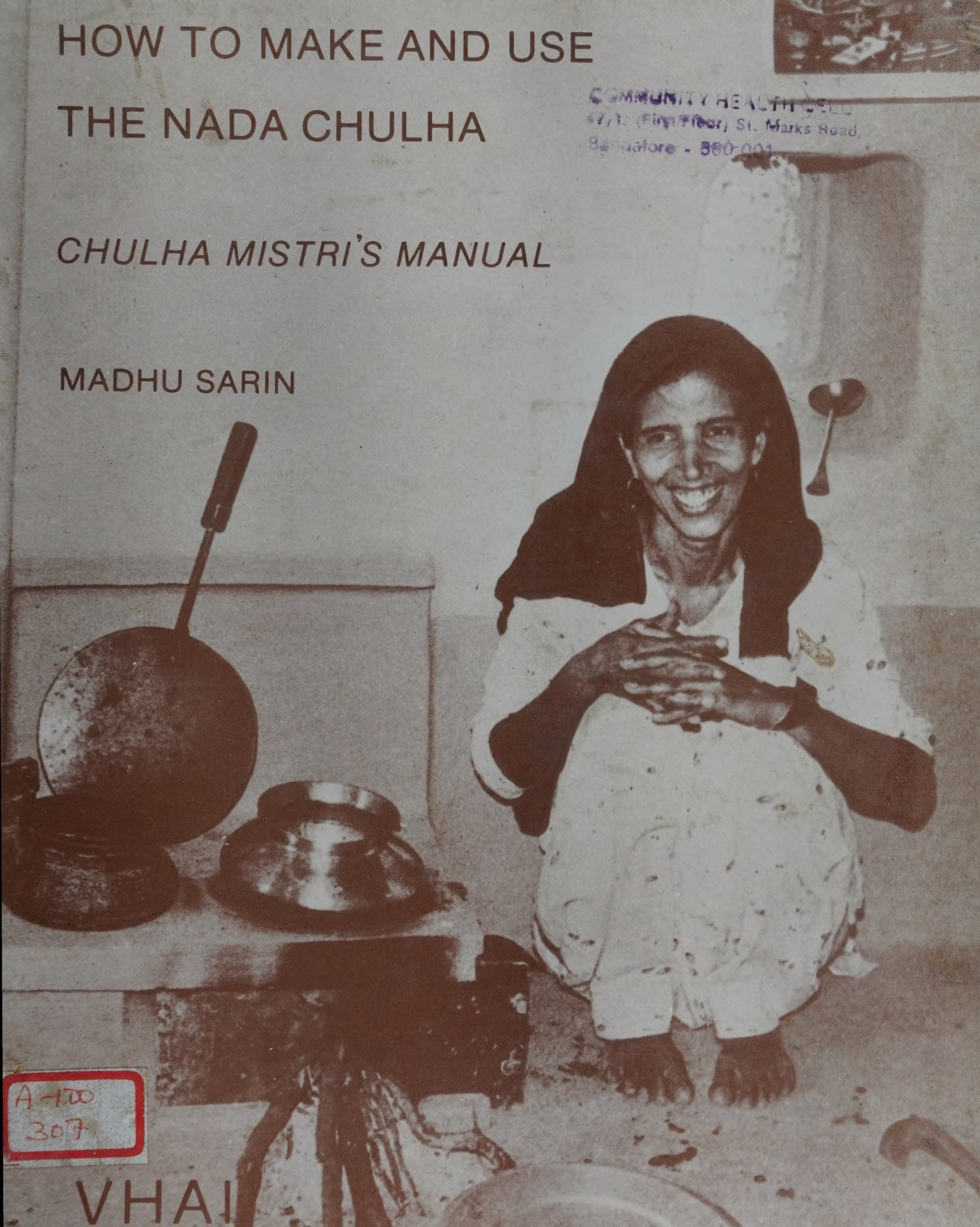
HOW TO MAKE AND USE THE NADA CHULHA

COMMUNITY HEALTH CELL
St. Marks Road,
Bangalore - 560 001

CHULHA MISTRI'S MANUAL

MADHU SARIN



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Who is this manual for?

We have specially prepared this book for use by village women trained to work as chulha mistris. This includes mistris who cannot read or write.

How to use this manual?

The book has 7 chapters. Each chapter is about a different aspect of the Nada Chulha. Everything is explained with drawings or photographs and a little writing. In many places, the drawings show both the right and wrong ways of doing things.
Next to the right drawing,
there is the face of a smiling woman.
Next to the wrong drawing,
there is the face of an unhappy woman.
The written material will be explained to chulha mistris during their training. Afterwards, they can use the book during their work when they have any problems. If they do not know how to read, they can ask a child or adult who can read to explain the matter to them.

The book should not be used as a do-it-yourself manual.

It should be used only by trained mistris. A trial edition of chapters 3 to 6 has been used by many of our trainees. They found chapter 6 with its plans particularly useful while building different types of chulhas.

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Photographs Madhu Sarin

Voluntary Health Association of India

This book is dedicated to the women of Nada village in Haryana who have actively participated in the development of the chulha and after whom the chulha is named.....

and to village women in several parts of India with whom and from whom we continue to learn.

The publication of this manual and its low price were made possible by financial support provided by SIDA, the Swedish International Development Authority, Stockholm.

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This Manual is available in Hindi also.

Companion publications include:

1. .Nada Chulha, A Handbook (Hindi and English)
2. How to make best use of the Nada Chulha (poster in Hindi)
3. Why should you adopt the Nada Chulha (promotional poster in Hindi)

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Chapter 1

THE NADA CHULHA & WOMEN.

1. WHAT IS THE IMPROVED NADA CHULHA?

Somti, a proud and happy chulha mistri of Nada, with the new Chulha she has built.

The Nada Chulha is an improved form of the old chulha (stove). A tunnel connects its firebox to a chimney. The construction of the chulha makes the fuel burn better. Two or three things can be cooked on it at the same time with only one fire. As smoke goes out of the kitchen through the chimney, the chulha becomes 'smokeless'. As the chulha can also save cooking time and fuel, it is called an 'improved' chulha.

2. THE STORY OF THE NADA CHULHA

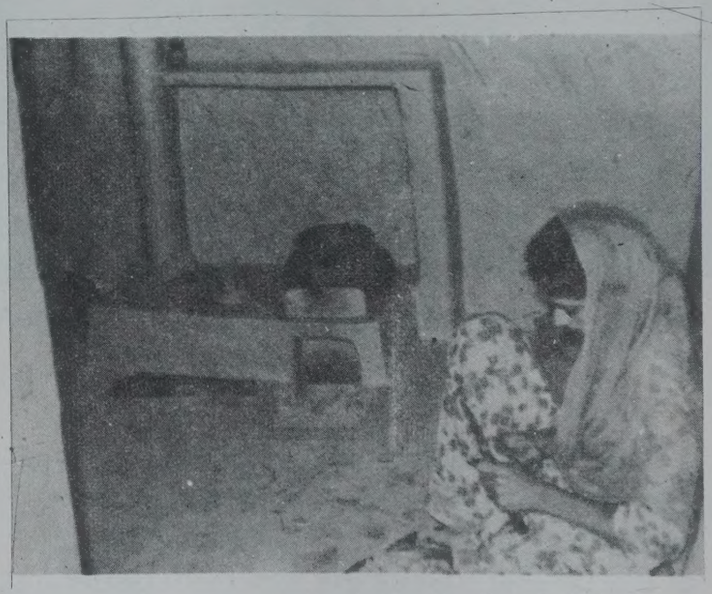
The Nada Chulha was developed in many village kitchens. This started in Sheela's small kitchen in Harijan Nada in October 1980. Nada is a village near the Shiwalik hilis in Haryana. Sheela is a poor landless woman. She wanted to remove smoke from her kitchen. Smoke hurt her eyes. It also made the whole house dirty. She wanted to improve her life. She also wanted to reduce her fuelwood consumption. Her son had to collect fuelwood from denuded hills. It was difficult and tiring work. He was always telling Sheela to burn less wood. Therefore Sheela was happy to try an 'improved' chulha. She agreed to fit a chimney to her old chulha. This way, the first smokeless Nada Chulha was built in Sheela's kitchen.

Other women of Nada also liked Sheela's new chulha. One by one, many of them got improved chulhas built. Krishna built one herself. All the women helped to make the chulha still better. They spoke about its advantages. They also pointed out the problems of the chulha. They tried to solve many of the problems themselves.

The Improved Nada Chulha described in this booklet is the result of Nada women's combined work. This chulha works much better than the first chulha built in Sheela's kitchen. It has been called 'Nada Chulha' because Nada women have helped to develop it. They have shown that village women can do a lot to improve their lives. Women can also help other women to make their lives better.

Sheela cooking on her old chulha in a blackened kitchen.

A desire to change.....
Sheela fixing a chimney to her old chulha



Sheela's changed kitchen - clean, healthy, bright.

3 OLD CHULHAS AND WOMEN'S LIVES

Most women have to spend many hours cooking on old chulhas everyday. Old chulhas make women's lives very difficult:

- Smoke hurts women s eyes and lungs.
- Women have to cook in dark kitchens. Cleaning dirty walls takes a lot of time and labour.
- Smoke also enters other rooms and makes the whcle house dirty.
- Cooking on a one pot chulha can take a long time. Women have to sit in heat and smoke all this time.
- Pots become black all over. Scrubbing them everyday is hard work. It also hurts women's hands

— Old chulhas may also use more fuel. Collecting and preparing fuel takes a lot of time. This work is mainly done by women and children. Everyday it is becoming more difficult to collect fuelwood from bare hills.

— Women have little time for rest, child care or other productive work.

4. WHAT CAN THE IMPROVED NADA CHULHA DO FOR WOMEN?

Shining pots on a Nada Chulha on which three things can be cooked at the same time.

Krishna of Nada village saves a lot of time with her new chulha. She makes rope in the saved time.

—An improved chulha takes smoke out of the kitchen. Cooking becomes easier. Women are more protected from the heat of the fire while cooking.

—A clean and bright kitchen can improve the health of the whole family.

—The house also remains clean.

—Pots do not become black all over. Cleaning them becomes easier.

—To or three things can be cooked at the same time. Cooking takes much less time.

—An improved chulha can use less fuel Collecting fuel takes less time and labour.

—In the saved time, women can do other things to improve their lives.

5 WHERE CAN THE NADA CHULHA BE USED?

Cooking fuels: Most fuels from plants can be burnt in the Nada Chulha. These include fuelwood, dung cakes, agricultural residues, bushes, weeds and pine needles.

Type of food cooked: The Nada Chulha can be used in both rice and **roti** (unleavened bread) cooking areas.

Family circumstances: The chulha cannot be moved around. Therefore, the families using it should have a pucca place to live. They should also need to cook or heat two things at the same time.

Women's views: The chulha should be used by women who want to remove smoke from their kitchens and use less fuel and time for cooking.

Family use: The chulha described in this booklet is only for family use.

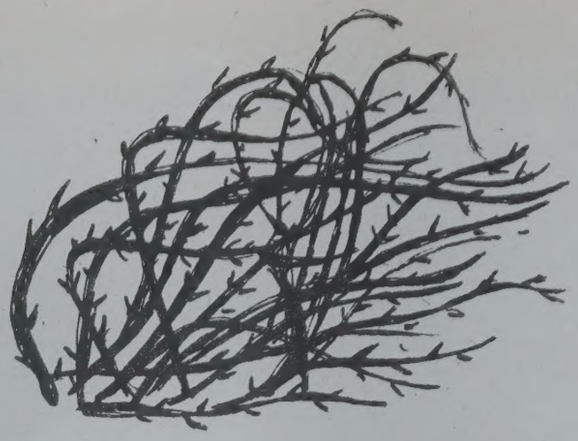
States where the Nada Chulha has been used: Till now, the Nada Chulha has been used in Haryana, Himachal Pradesh, Punjab, Uttar Pradesh, Rajasthan and Gujrat. Users in these states are liking the chulha very much.

6. WHERE SHOULD THE NADA CHULHA NOT BE USED?

Cooking fuel: The Nada Chulha should not be used where the main cooking fuel is coal, coke or balls made of mud, cow dung and coal powder.

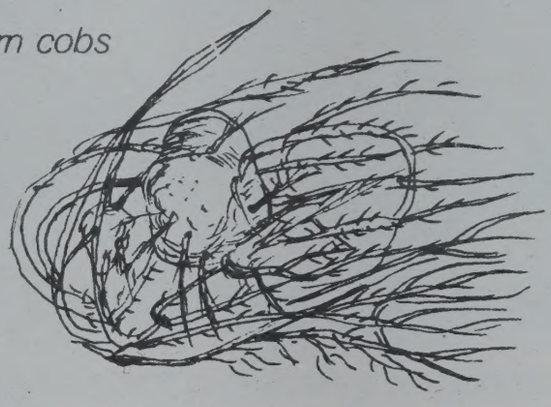
Family circumstances: The Nada Chulha will not suit homeless persons or families who move from place to place. Very poor families, who are able to cook only one thing for eating, also may not find the chulha very useful.

Special needs: In some areas, people do not want to remove smoke from their kitchens. They find the smoke useful for many things. The Nada Chulha should not be used there without changing it first.

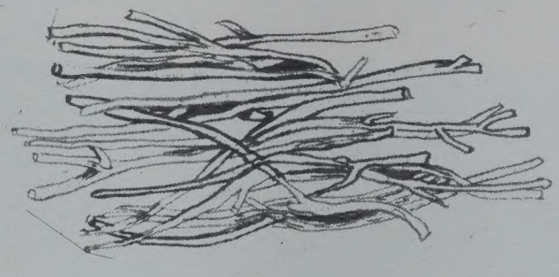


Thorny bushes

Corn cobs



Roots and weeds



Agricultural residues.

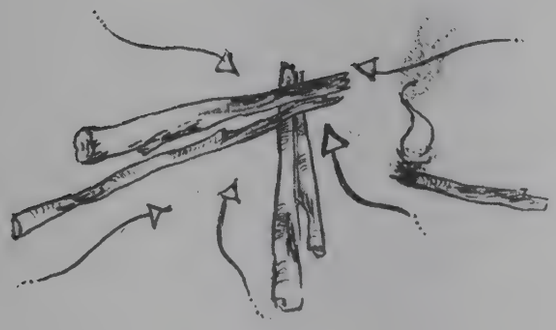
Fuelwood

Dung cakes,

Chapter 2

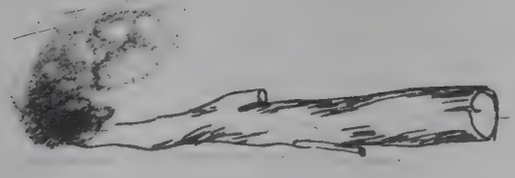
HOW DOES THE NADA CHULHA WORK?

1 HOW DOES WOOD BURN?



1.1. Three things are needed to start a fire: fuel, air and heat. If you take away any one of them, the fire will stop burning.

1.2. When wood burns, it changes into two things: gases and charcoal. At first the gases burn with bright yellow flames. These gases need high temperature and air to burn properly. About 80 percent of the heat of the wood is in the gases.



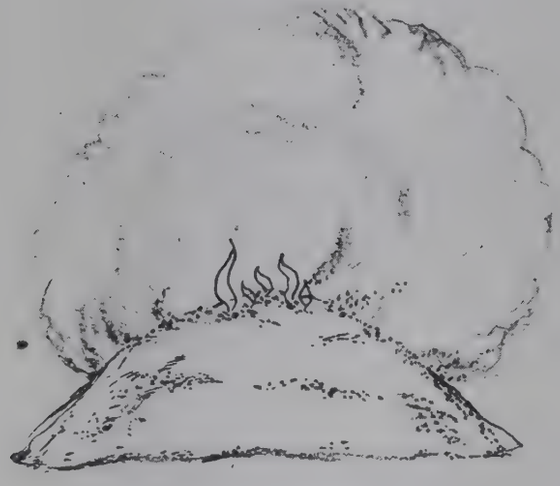
1.3. If the gases are not hot enough, or if they do not get enough air, they leave the wood as smoke. A smoky fire means that a lot of the wood is being wasted as the gases are not burning properly.

1.4. When the gases are finished, the charcoal starts to burn. Charcoal burns with small, bluish flames.

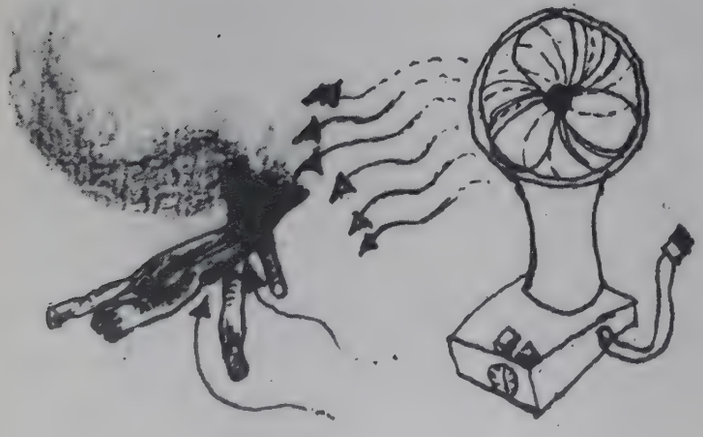
1.5. When both the gases and charcoal are burnt, only ash is left. Ash does not burn. Other fuels from plants burn in the same way as wood. The only difference is in their shapes and sizes and they leave more ash behind..

2. AIR SUPPLY TO THE FIRE

2.1. A fire cannot burn without air. By controlling the air going to a fire, we can control the fire itself.

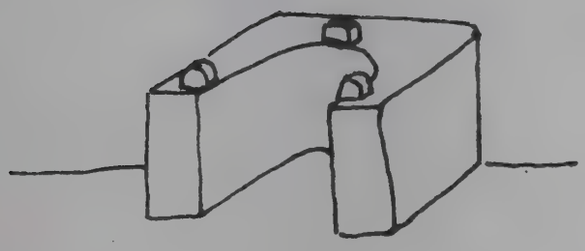


2.2. If enough air does not reach the fuel, it will not burn properly. This is why a heap of saw dust is difficult to burn and gives off a lot of smoke.

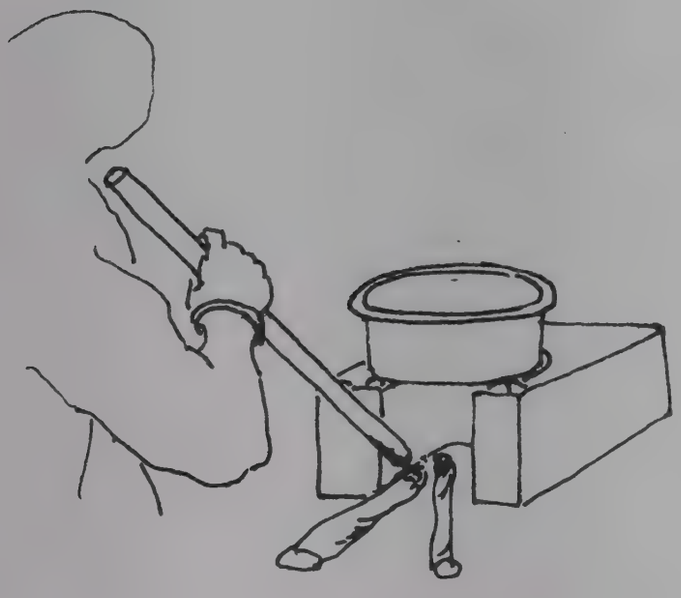


2.3. If the air is too much, the fuel will burn faster. But too much air can make the gases too cold to burn. Fuel is wasted if this happens.

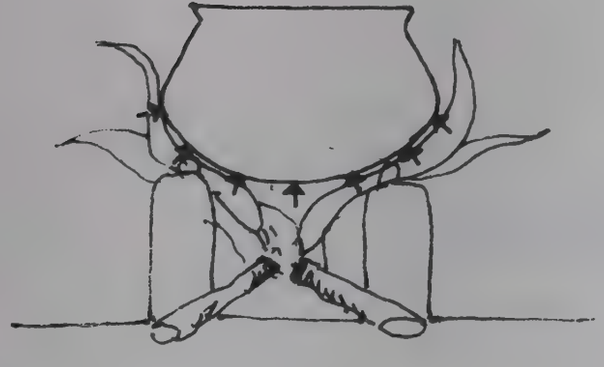
3. HOW DOES AN OLD CHULHA WORK?



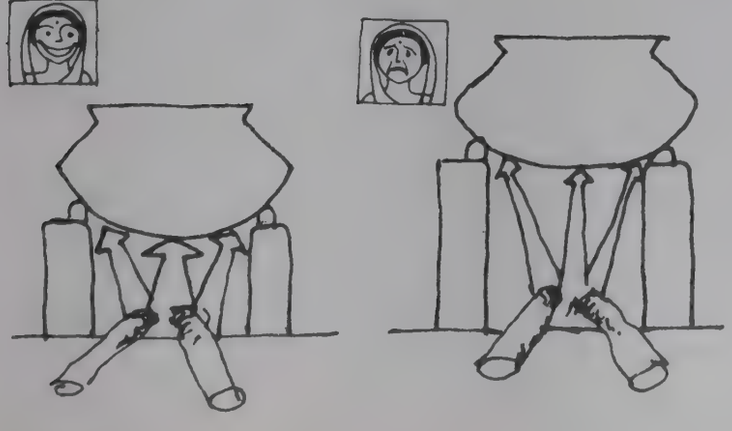
3.1. The simplest type of old chulha has three walls and an open front. Air for the fire comes in from the front. Smoke and flames go up and out from the space between the humps and the pot.



3.2. To give the fire more air, you have to blow in the fire. You have to do this when lighting a fire or when the fire is not burning well.



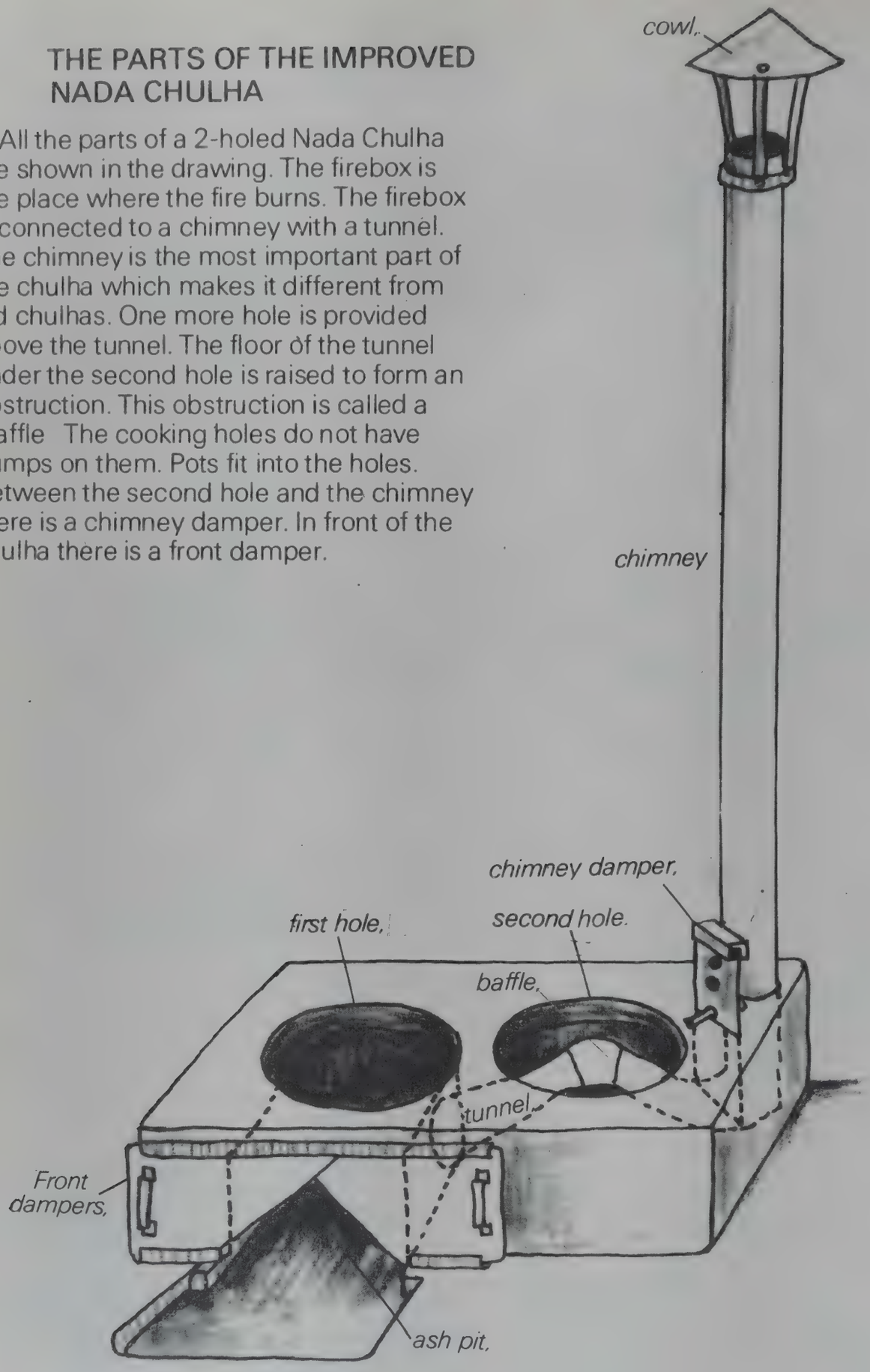
3.3. The pot gets heat from the flames from its bottom and sides. But a lot of the heat of the flames is lost outside.



3.4., The amount of heat the pot gets from the charcoal depends on the height of the chulha. If the chulha is higher, the pot will get less heat. You also lose some of the fire heat through the open front.

4. THE PARTS OF THE IMPROVED NADA CHULHA

All the parts of a 2-holed Nada Chulha are shown in the drawing. The firebox is the place where the fire burns. The firebox is connected to a chimney with a tunnel. The chimney is the most important part of the chulha which makes it different from old chulhas. One more hole is provided above the tunnel. The floor of the tunnel under the second hole is raised to form an obstruction. This obstruction is called a 'baffle The cooking holes do not have humps on them. Pots fit into the holes. Between the second hole and the chimney there is a chimney damper. In front of the chulha there is a front damper.



A 2-holed Nada Chulha and its parts

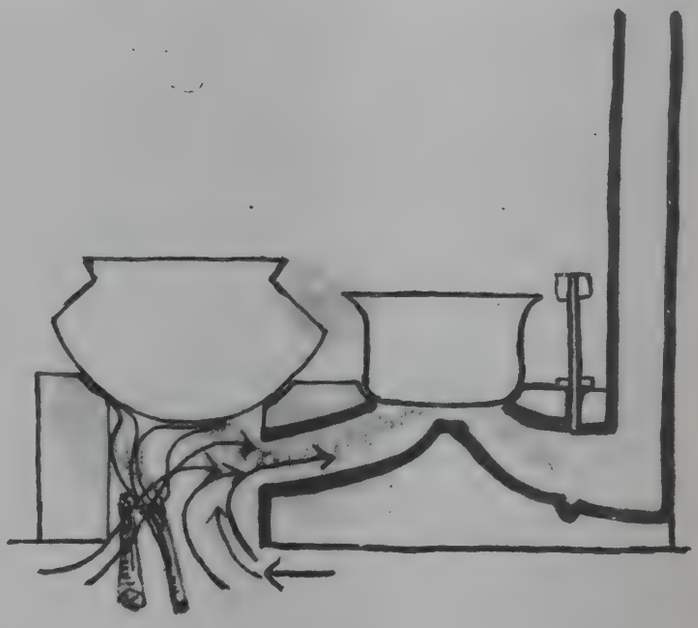
5. HOW DOES THE NADA CHULHA MAKE THE FUEL BURN BETTER?

They chimney and the firebox are the two parts of the Nada Chulha which make the fuel burn better.

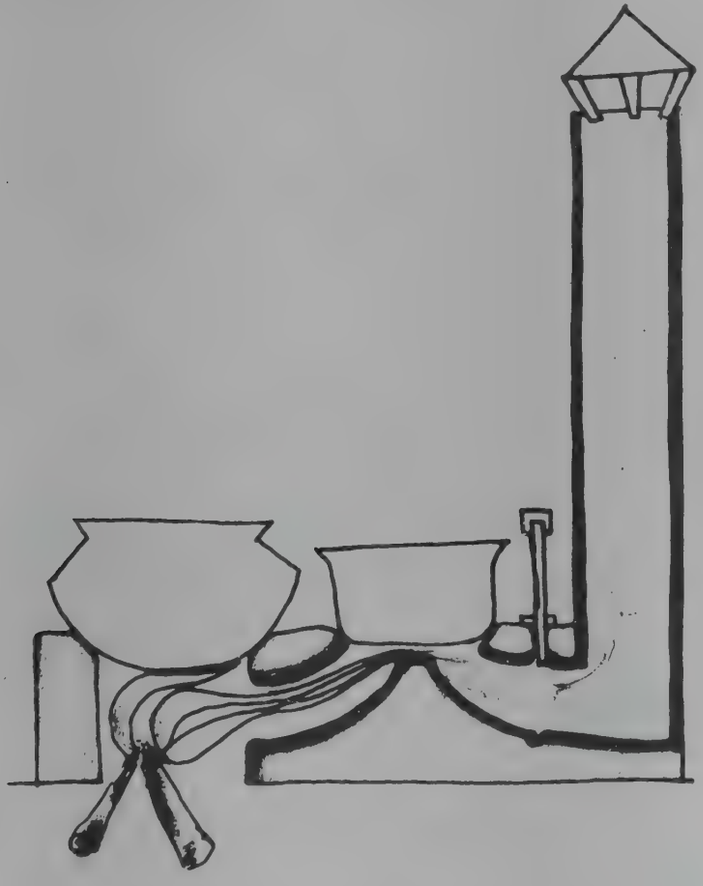
The Chimney

5.1. The chimney does two things: It pulls air into the chulha and takes smoke out of it. This pull of the chimney is called 'draft'. The flow of air to the fire started by the draft makes the fuel burn better.

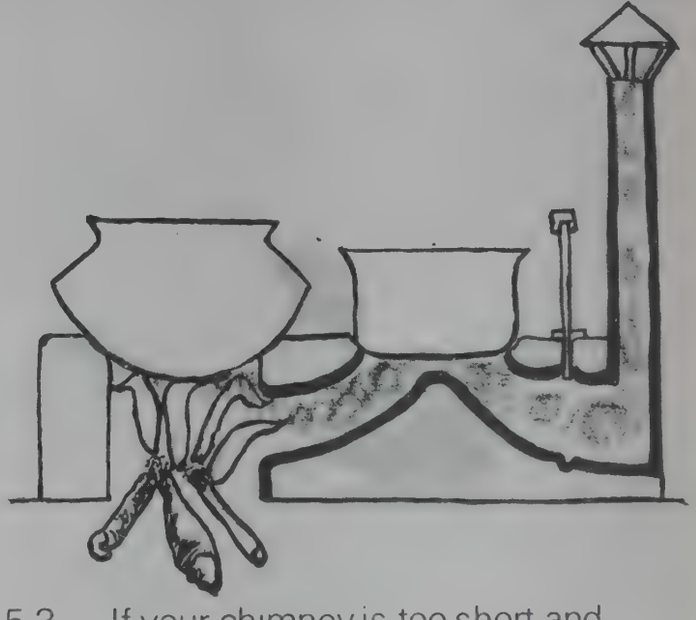
Draft takes place because the gases heated by the fire become lighter and therefore rise up the chimney. The space left by the rising gases is filled by colder and heavier air coming in through the firebox mouth. But you have to be careful with a chimney.



You must choose the size of the chimney carefully for the size of the chulha. A bigger chulha needs a bigger chimney. A smaller chulha needs a smaller chimney.



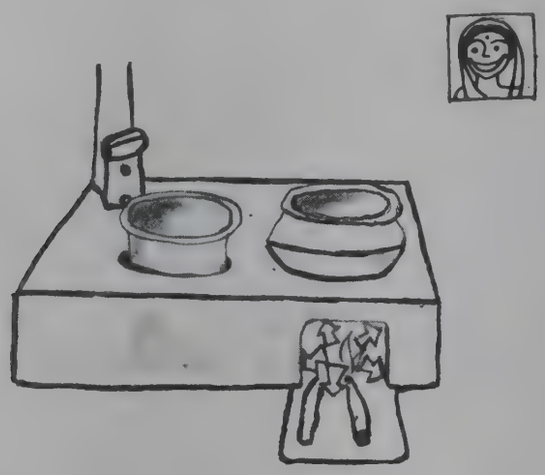
5.2. If the draft is too strong, the fuel will get too much air and burn too fast. But the sideways pull of the chimney will take the flames away before they have touched the pot. This happens if you use a wider and taller chimney. A lot of fuel will be wasted as most of the fire heat will go out of the chimney.

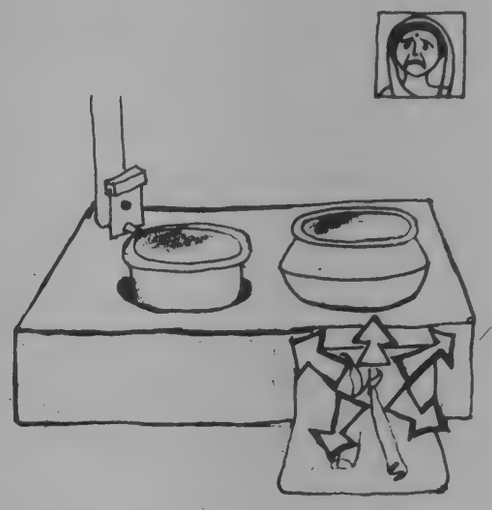


5.3. If your chimney is too short and narrow, it will not pull in enough air. The fuel will not burn well and more smoke will be produced. Again a lot of fuel will be wasted as the gases from the fuel will not be able to burn.

The firebox

5.4. The firebox of the Nada Chulha is closed from three sides. The pot fits the hole above it. Because of this, the fire does not lose too much heat to the outside. The temperature of the fire is much higher than in an old chulha. Therefore, more gases can burn and you can save fuel. The front opening of the firebox has two functions: giving air to the fire and putting in the fuel.





5.5 You should keep the opening big enough to put in the fuel easily.

5.6. However you must not keep it so big that too much heat of the fire goes outside through it.

The height of the firebox.

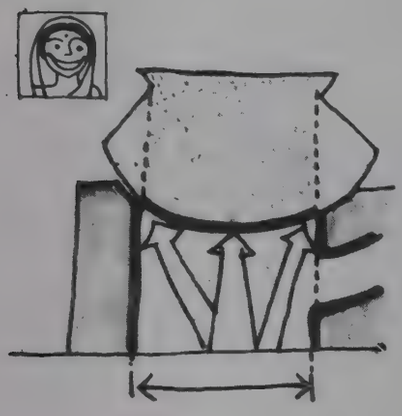
5.7. The height of the firebox (the distance between its floor and the pot bottom) of the Nada Chulha lets the fuel get enough air to burn properly. It also lets the pot get more heat from the flames and charcoal of the fire.

5.8. You should not make the firebox so low that enough air cannot reach the fuel for the gases to burn properly.

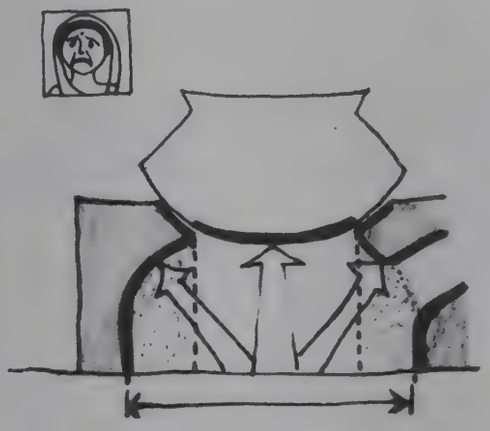
5.9. You should not make the firebox so high that the pot does not get enough heat from the charcoal. The flames will also get pulled away by the chimney without touching the pot.

6. HOW DOES THE NADA CHULHA GIVE MORE HEAT TO POTS?

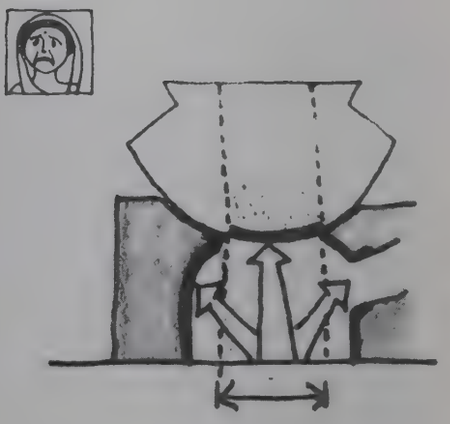
Width and depth of firebox



6.1. The width and depth of the firebox of the Nada Chulha are kept about the same size as the most used pot.



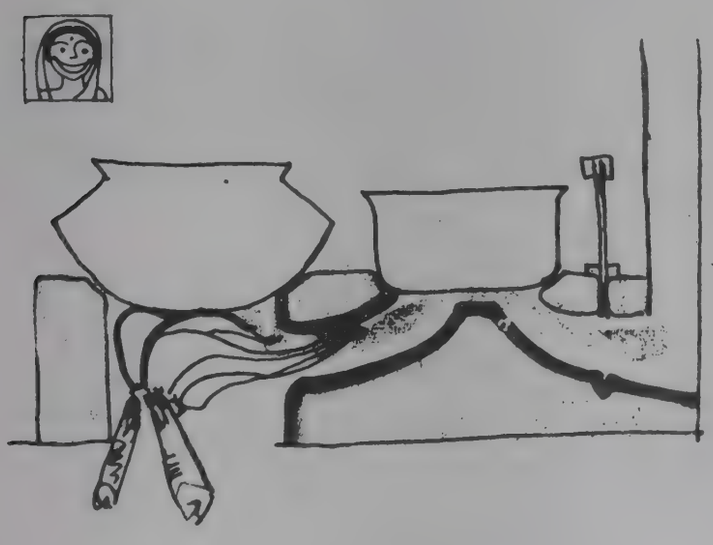
6.2. . If you put a small pot on a big firebox, you will see that only a small part of the flames touch the bottom of the pot. The rest touch the roof of the firebox and are wasted.



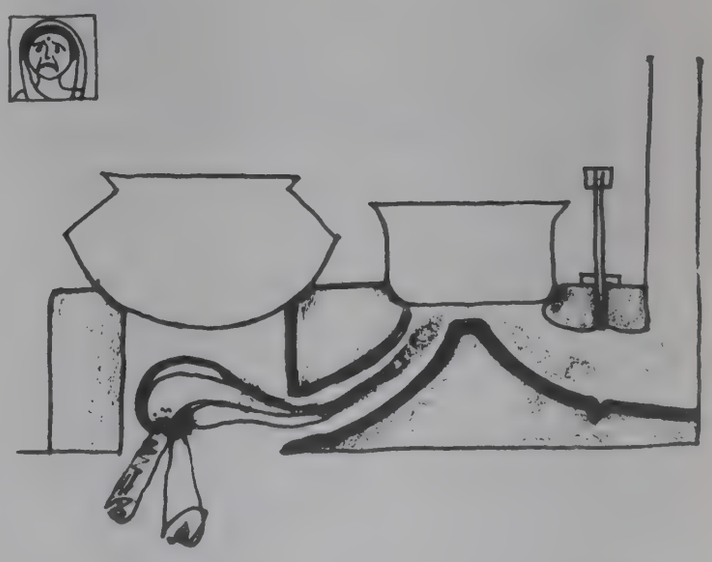
6.3. Similarly, if you put a big pot on a small firebox, only a small part of the pot gets heat from the fire. If this is done, cooking will take a long time.

Tunnel joining the firebox to the chimney

6.4. The Nada Chulha uses some of the heat in the hot gases and smoke going out of the chimney. This is done by making the tunnel joining the firebox to the chimney longer and keeping one or two cooking holes on it.



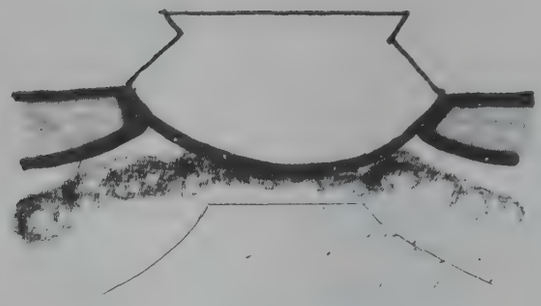
6.5. The mouth of the tunnel is kept about 3"(75 mm) above the floor of the firebox.



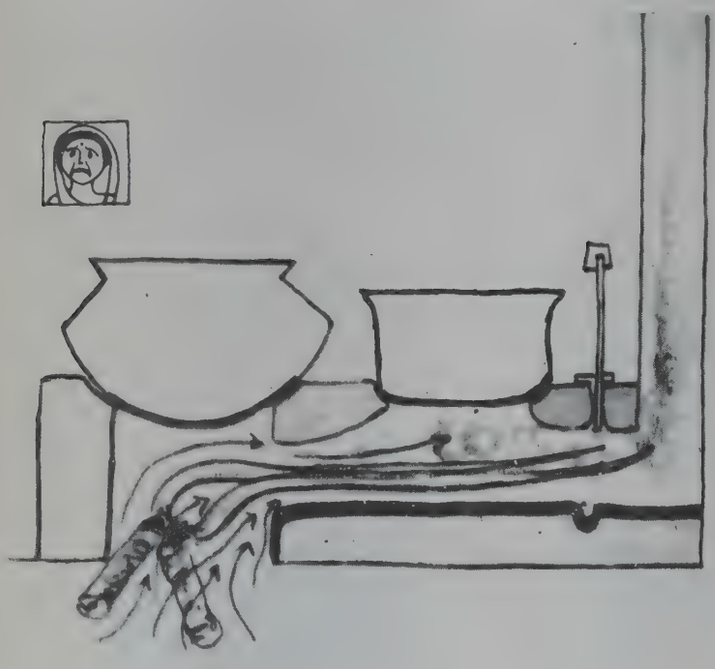
6.6. If you keep the tunnel mouth near the firebox floor, the flames might be pulled away by the chimney without touching the pot.

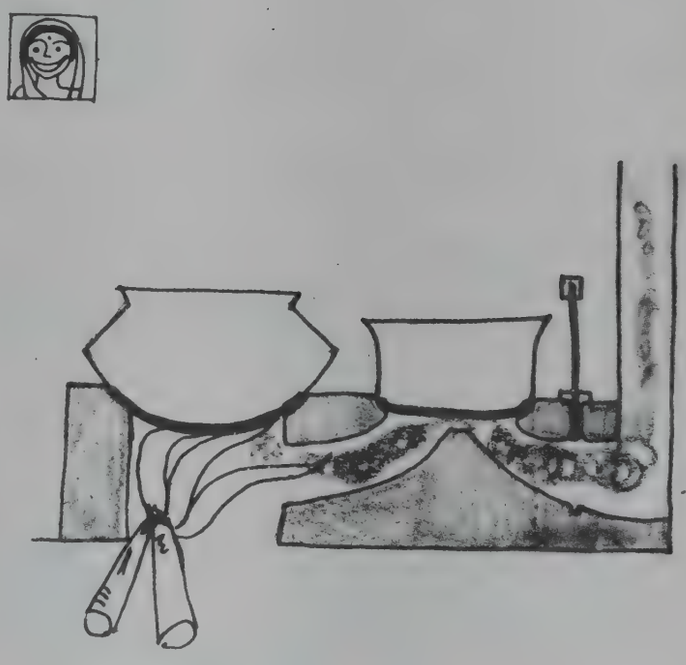
Size of cooking holes.

6.7. Pots have to fit into the cooking holes of the Nada Chulha so that smoke cannot come out of the holes. The holes are kept as big as possible for the size of the pots. This makes a bigger part of the pot bottom get heat from the flames and hot gases.



Baffles under cooking holes



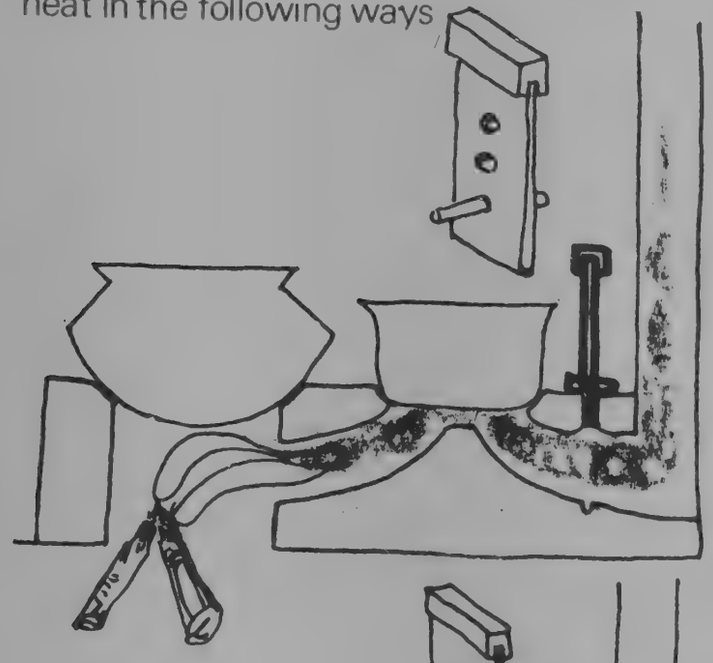


6.8. By putting glass dishes on the holes of the chulha, you can see that the flames go through the tunnel at a high speed but, they do not touch the pot in the second hole.

6.9. If you raise the floor of the tunnel under the second hole, you will see that the flames are forced to hit the pot before going to the chimney. These obstructions are called 'baffles'. Baffles are made under the second and third holes of all Nada Chulhas so that pots get more heat from hot gases

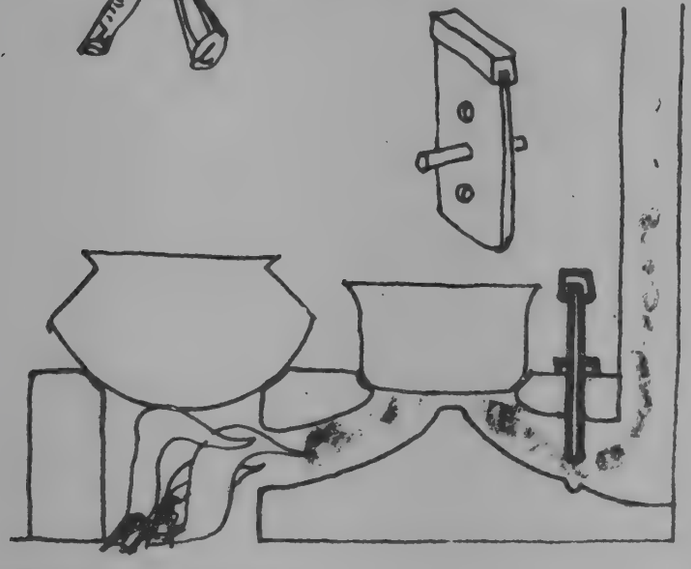
7. HOW HEAT CAN BE CONTROLLED IN THE NADA CHULHA.

It is important to control the heat of the fire to save fuel. You should be able to get more or less heat according to need In the Nada Chulha, you can get more or less heat in the following ways



Chimney damper

7.1. When the chimney damper is pulled up, the tunnel is fully open. The chimney can pull in more air and make the fuel burn better and faster. You should keep the chimney damper fully open when starting a fire.



7.2. By closing the chimney damper almost completely, you can reduce the air pulled in by the chimney. By doing this, you can make your fire burn more slowly.

7.3. By closing the chimney damper completely, you can stop the chimney from pulling in any air. If you close the chimney damper when your cooking is finished, you can keep your chulha hot for many hours.

Front dampers*

7.4. The front dampers have two sliding doors. They serve four functions:

1. By opening or closing them, you can make the cold air entering the firebox more or less.
2. By keeping them almost closed you can make the heat going out of the firebox less.
3. When almost closed, the front dampers reflect heat back on the fire and make it burn better.
4. They protect the cook from the fire heat in hot climates.

*The design of the front dampers was developed by the 'Dhauladhar Chulha team of the Indo-German Dhauladhar Project, Palampur, H.P.

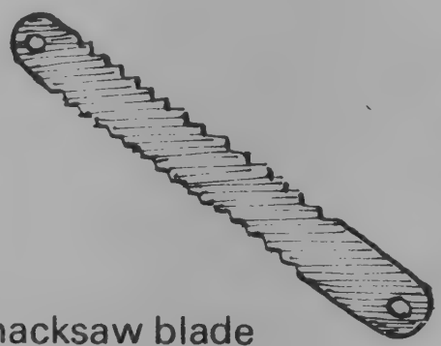
Chapter 3

WHAT DO YOU NEED TO BUILD THE CHULHA?

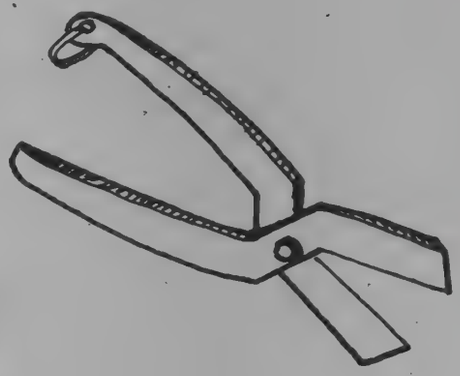
1 TOOLS

You need only a few simple tools to build the Nada Chulha.

A Khurpi



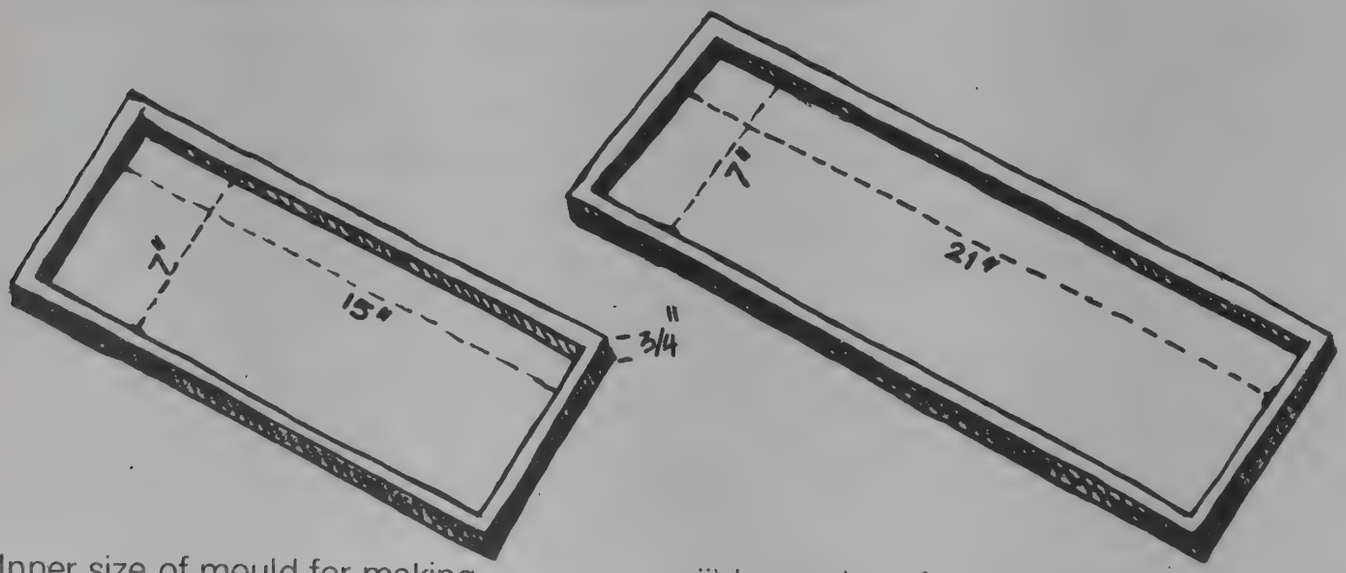
A hacksaw blade (used for cutting metal)



A metal sheet cutter

A measuring tape

A wooden mould for making chaapris (mud slabs)



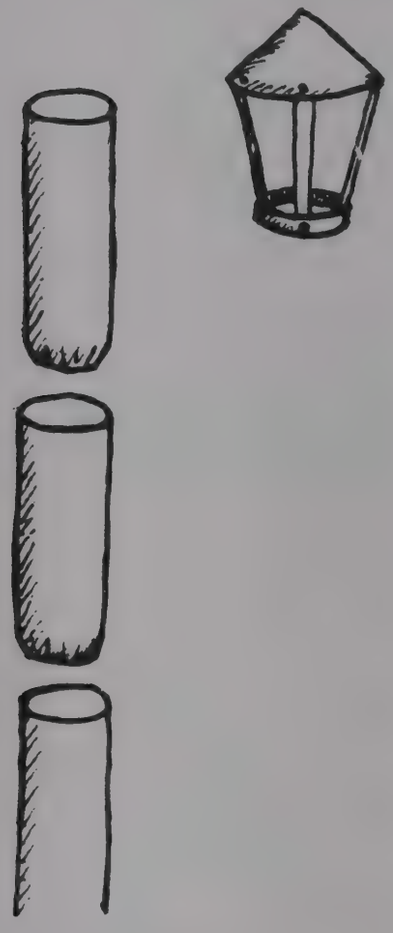
i) Inner size of mould for making small chulhas

ii) Inner size of mould for making bigger chulhas.

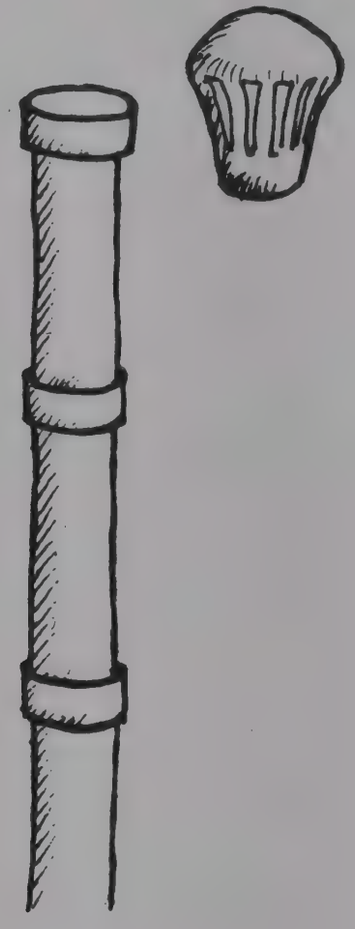
2. MATERIALS.

These materials are needed for making the chulha.

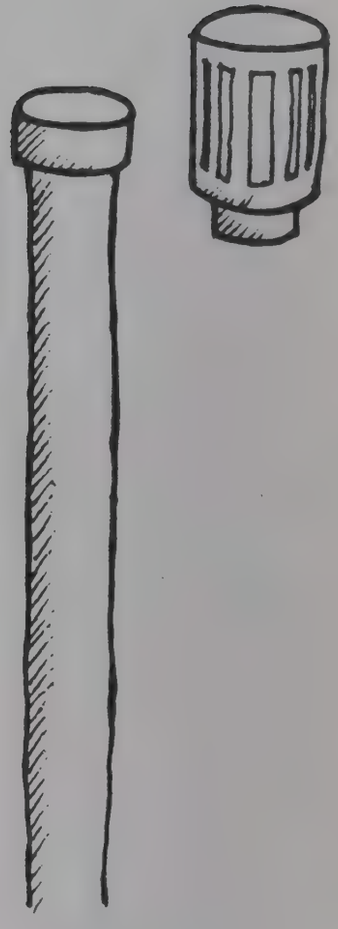
2.1. Chimney and cowl



—In hilly areas these can be made from metal sheet or by cutting 5 kilogram ghee tins.



—In the plains the chimney and cowl can be of baked clay. Village potters can make 1-2 feet(300-600 mm) long chimney pieces.



—If there are no potters, asbestos cement pipes can be used for the chimney.

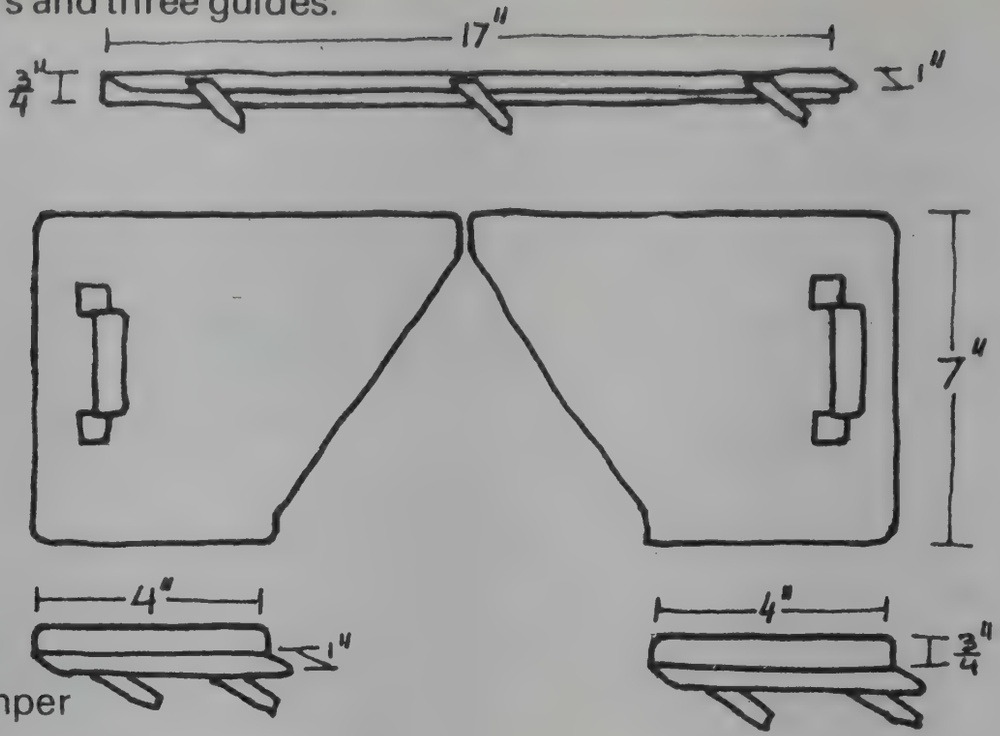
Chimney size

The chimney should be long enough to go 2 feet (600 mm) above the roof. For a small 2-holed chulha, the chimney diameter should be 3 inches (75 mm).

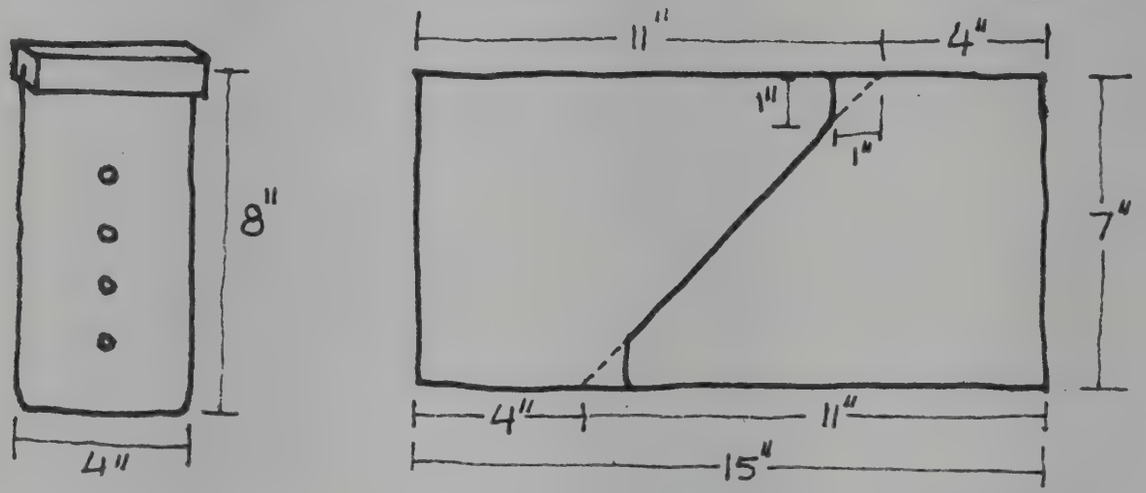
For a 3-holed chulha with one tunnel the chimney diameter should be 4 inches (100 mm).

In high mountain areas, the chimney diameter for any chulha should not be less than 4 inches (100 mm).

2.2. Front dampers and three guides.

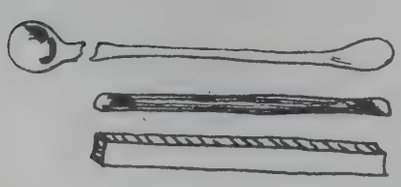


2.3. Chimney damper



The front dampers can be cut from one piece of metal sheet like this.

Both dampers are made of stiff metal sheet of 22 to 24 gauge. All sharp corners of dampers and guides should be cut off.



2.4. One or two ¼ inch (6 mm) diameter iron rods or a stiff metal strip. Any waste piece of metal can be used.

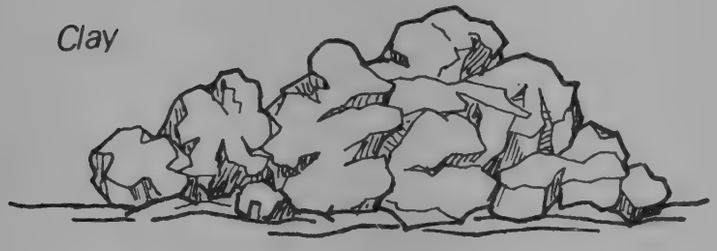
2.5. Some dry earth

3. MATERIALS FOR MAKING GARA.

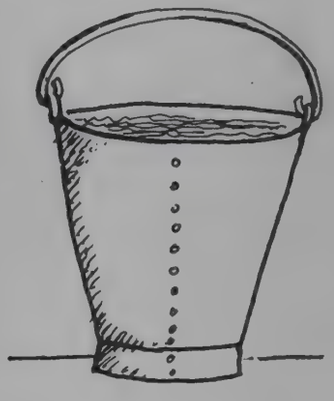
The chulha and *chaapris* (mud slabs) are made with *gara*. Gara is made by mixing some fibrous material with good clay. Because of this, the gara becomes strong and does not crack on drying. You can make good gara by mixing equal quantities of clay and wheat or rice straw cut into small pieces.

But good clay or straw are not easily available in some places. Therefore, other things are added to the clay to make gara. In a new area, you should ask local village women what they mix with clay to make good gara. The drawings show some of the common materials used to make gara.

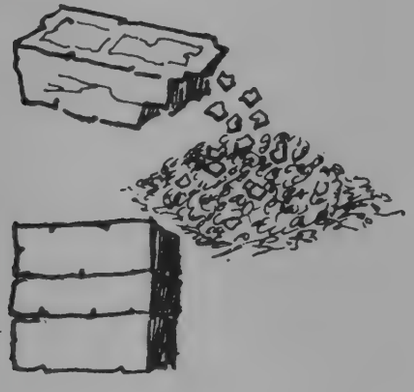
Clay



Water

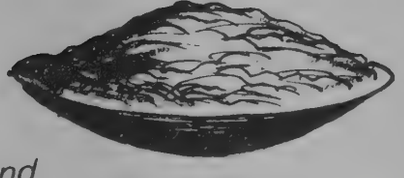


powdered brick,



Chopped straw

ash,



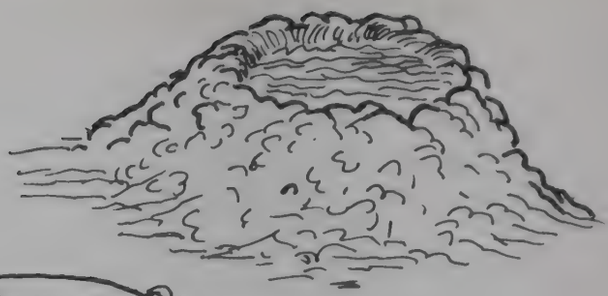
cow dung

sand

pieces of sack,

4. HOW TO MAKE GOOD GARA

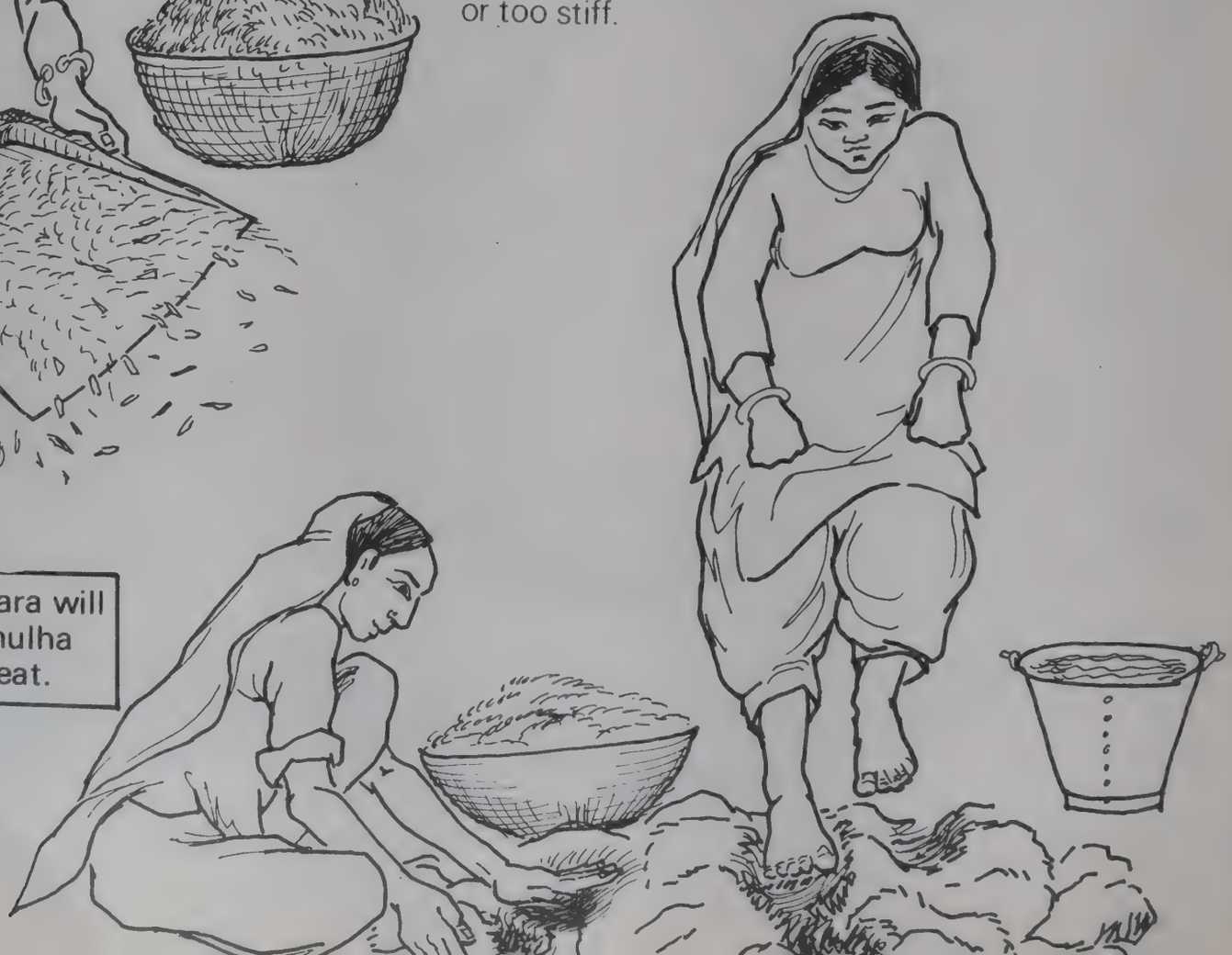
4.1. Choose the best clay available in the village. Remove all stones and roots from it and break all lumps.



4.2. Soak the clay in water for 3 to 4 hours.

4.3. Cut the rice or wheat straw into small pieces and remove all thick stems

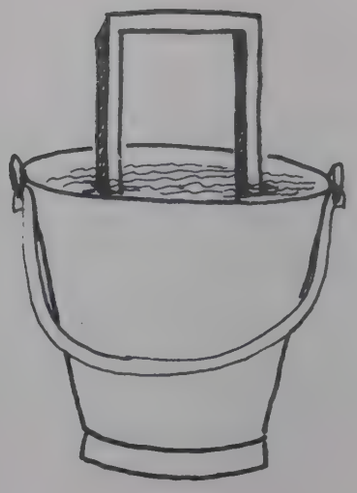
4.4. Mix the straw and the soaked clay very well. The gara should not be too thin or too stiff.



Well made gara will make your chulha strong and neat.

5. HOW TO MAKE CHAAPRIS (MUD SLABS)

5.1. Choose a flat surface which gets a lot of sun. Sprinkle some sand or straw on it. Dip the chaapri mould in water. The gara will not stick to the mould because of this.



5.2. Fill the mould with gara. Press the gara into corners and the sides of the mould with your fingers so that no space is left hollow.

5.3. After this, dip your hand in water and move it gently over the top of the gara. Make the gara level with the top of the mould.

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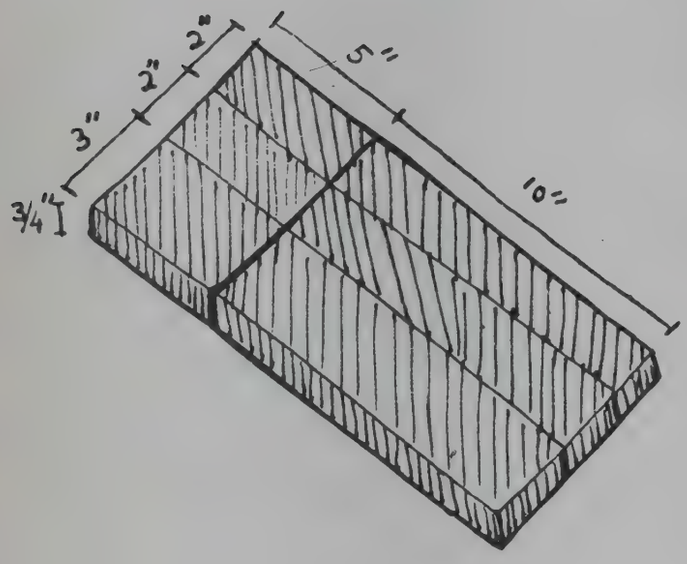
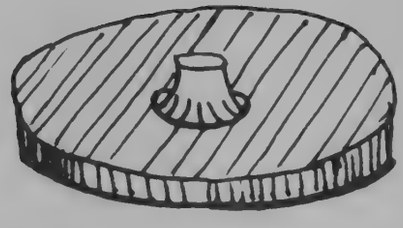
Bangalore - 560 001

5.4. Now lift the mould carefully with one hand while pressing the gara down with the other hand.

Make the required number of chaapris like this. The number of chaapris you need for different types of chulhas is given in chapter VI.

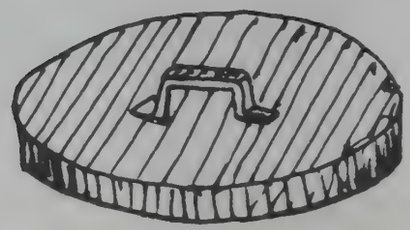


5.5. Make one extra chaapri. While this is still wet, cut it into smaller pieces as shown in the drawing. You can use these pieces for making the roof of the tunnel.



5.6. You should also make covers for the cooking holes at the same time.

Keep dry chaapris in a covered place till they are needed. This will save them from getting wet by rain or broken by children or cattle.

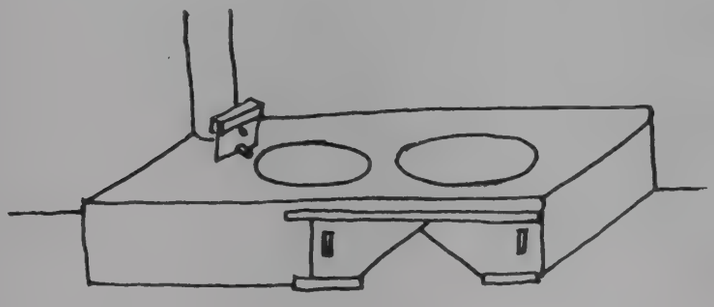


Chapter 4

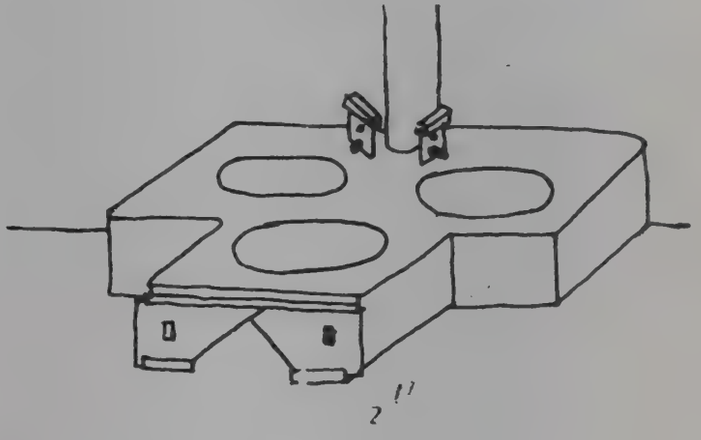
PLANNING THE CHULHA

1. WHAT TYPE OF CHULHA SHOULD BE MADE?

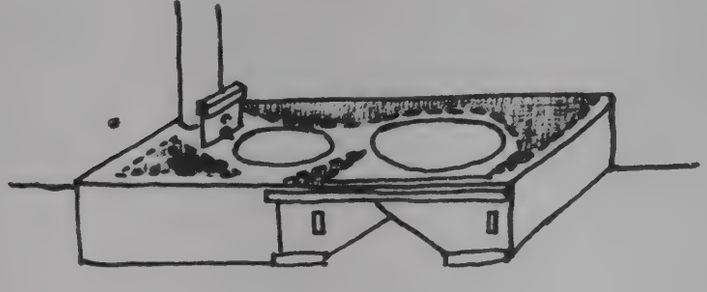
The Nada Chulha construction method can be used to build different types of chulhas for different needs. Every chulha **must** meet the needs of its user. To decide on the most suitable type of chulha for a family, you should find out :



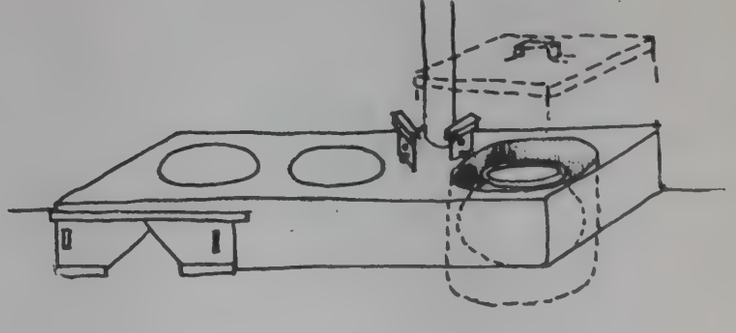
1.1 How many things are normally cooked at the same time? In the plains, a chulha with two cooking holes is enough for most families.



1.2. Does the family want to have a separate cooking hole for heating water or cooking food for cattle? For such families, a 3-holed chulha with two tunnels might be best.



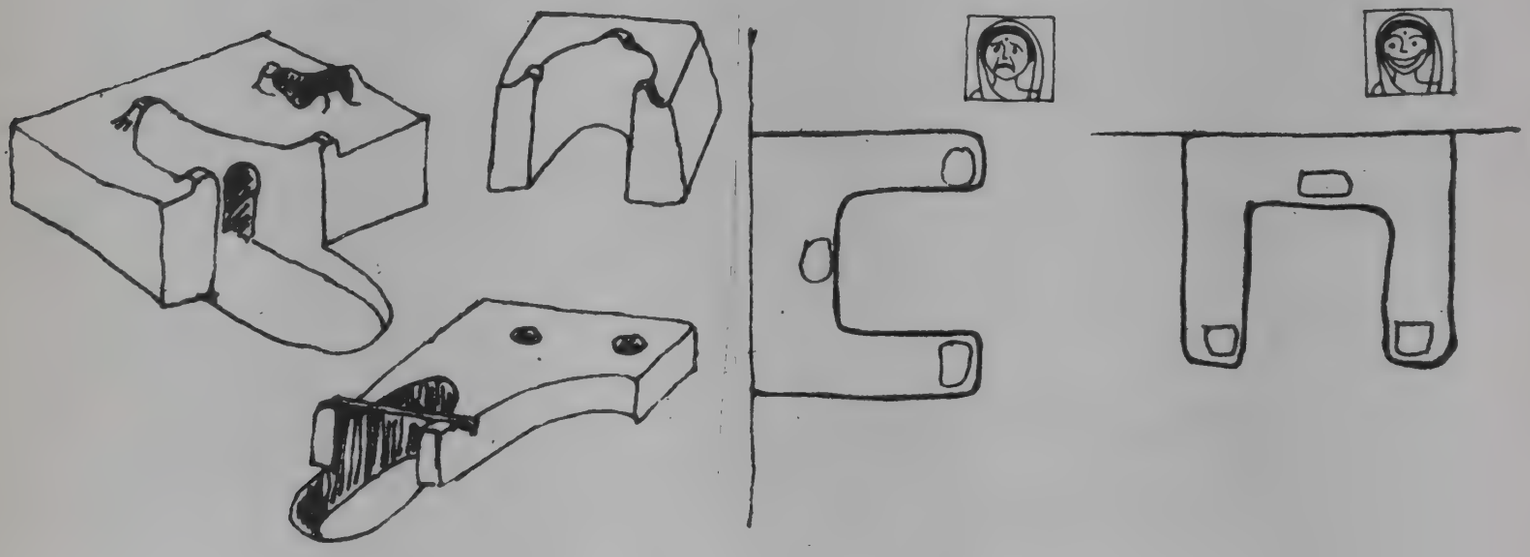
1.3. Does the family use the chulha only two or three times in a day with long gaps in between? For small families of this type, it is best to build a 2-holed hollow chulha.



1.4. Does the family use a hara for warming milk? You can build a chulha with a hara for them.

1.5. What are the sizes, shapes and materials of the pots used by the family? The chulha should be made big or small according to the sizes of the most used pots.

1.6. What cooking fuel does the family use? If dung cakes, agricultural residues or weeds are the main cooking fuel, the size of the firebox should be made a little bigger than for fuelwood.

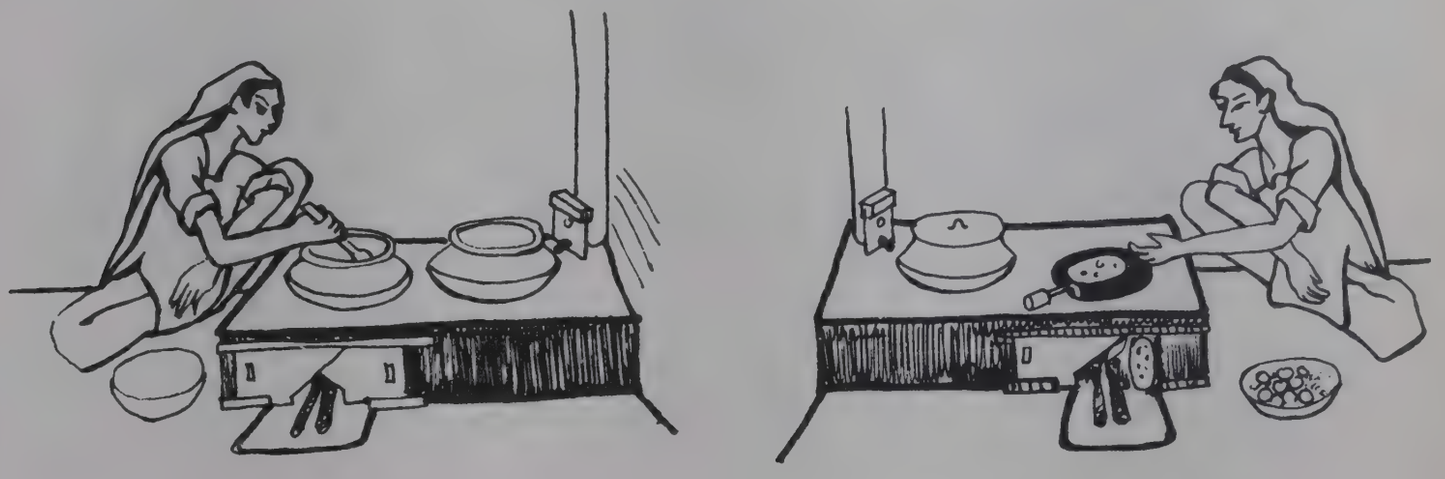


1.7. What is the family's old chulha like? The size and number of cooking holes of the old chulha will give a good idea about what the new chulha should be like.

1.8. Does the housewife have any strong views about the size, shape or location of her chulha or the direction in which it should face? In some areas, chulhas facing some directions are considered bad. It is better to find this out in advance as otherwise the chulha will not be used.

2. WHERE SHOULD THE CHULHA BE BUILT?

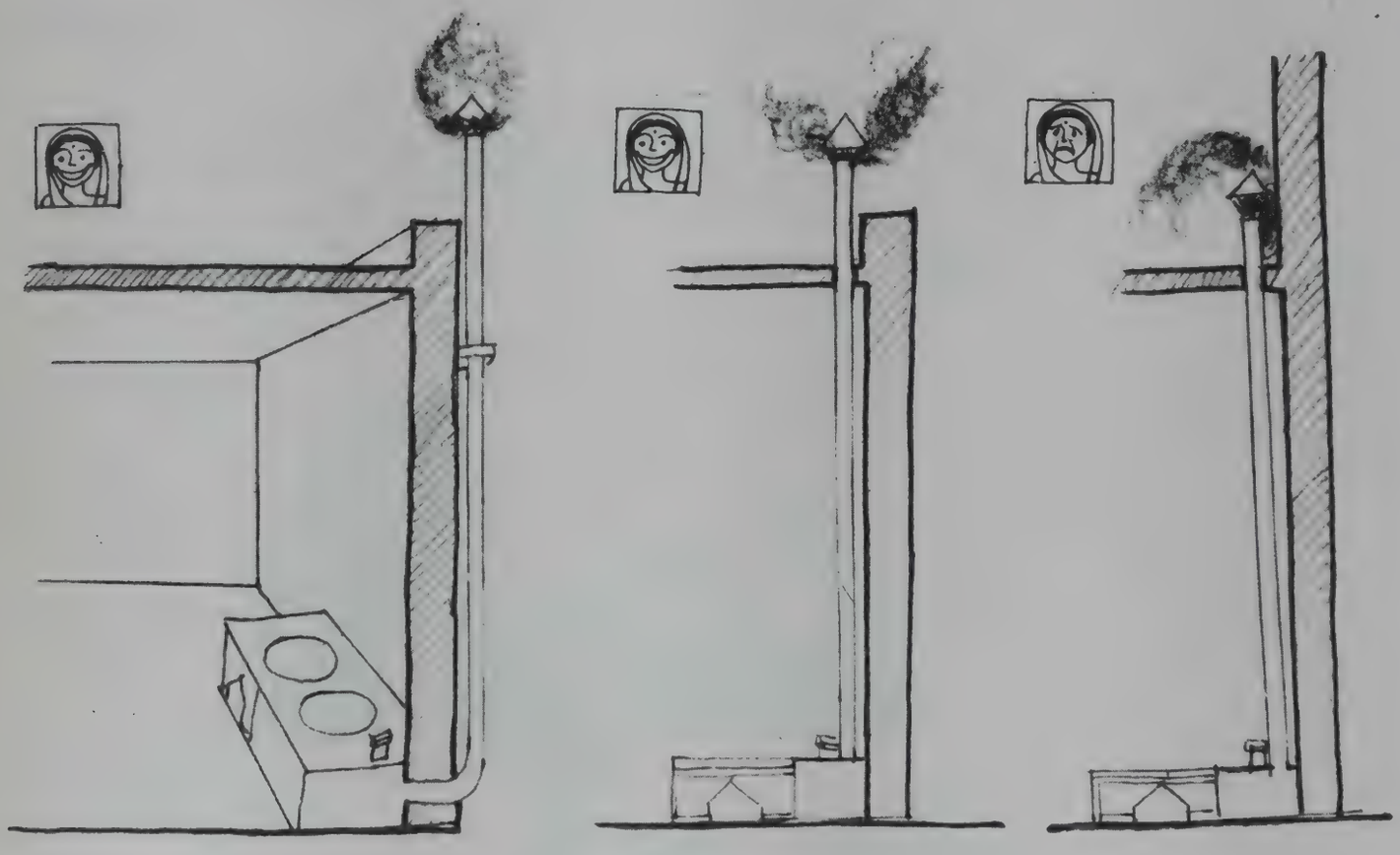
Chulha mistris must also find the best place in the kitchen for building the chulha. While choosing a place, make sure :



2.1. That the sitting position of the cook will be convenient for cooking. Some women use their left hand for cooking while others use their right hand. The cook should also be able to reach all pots and the chimney damper easily.

2.2. That there will be enough space in front of the chulha for using long firewood. In winter, other members of the family should also be able to sit around the chulha.

2.3. Do not keep the firebox next to a wall. When this is done, one door of the front dampers cannot be opened and other family members cannot sit around the chulha in winter.

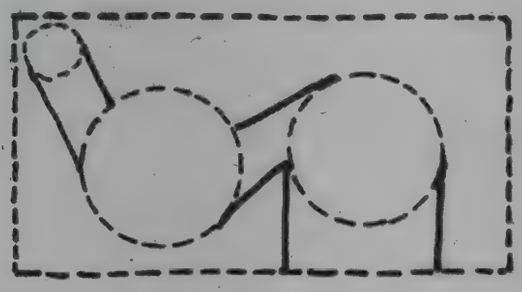


2.4. That it will be possible to fix the chimney by making a hole in the roof or by standing it outside. Chimneys fixed outside can be joined to the chulha tunnel through a hole in the wall.

2.5. That the chimney will not come out of the roof next to a rain water outlet, electricity wires or a high wall which may make the smoke come back.

3. HOW IS THE POSITION OF CHAAPRIS DECIDED?

You should follow some simple rules while deciding the position of chaapris. If you learn these rules, you will be able to make chulhas of different shapes and sizes. Your chulhas will also work well.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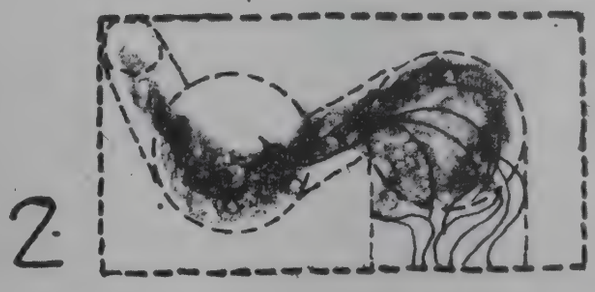
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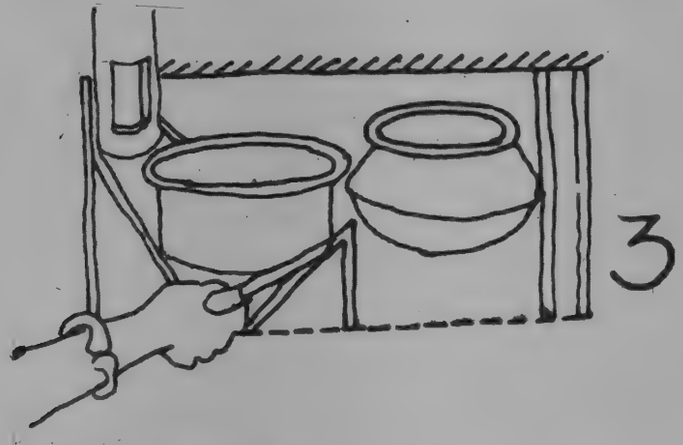
3.1. First of all, decide the position of the firebox and the chimney. Remember that you have to make a tunnel which joins the two

3.2. Try to make the tunnel bend under each cooking hole. Bends make pots get more heat from hot gases and flames. Do not make very sharp bends.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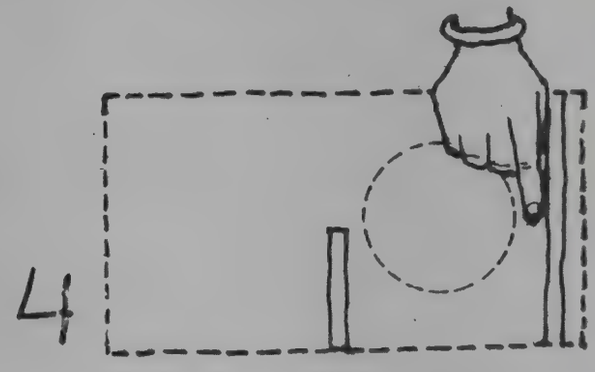
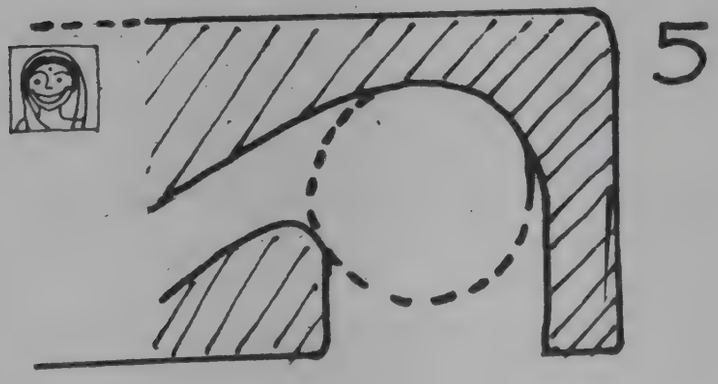

4

3.3. Always keep the most used pots in position while marking the lines of chaapris. The size of the chulha, the size of the holes and the distance between the holes should be based on the sizes of the most used pots.

3.4. Keep the side walls of the firebox parallel to each other. The distance between the walls should be 1-1½ inches (25-38 mm) more than the width of the hole to come above. This is so that at least ½" (13 mm) thick gara can be applied on both chaapris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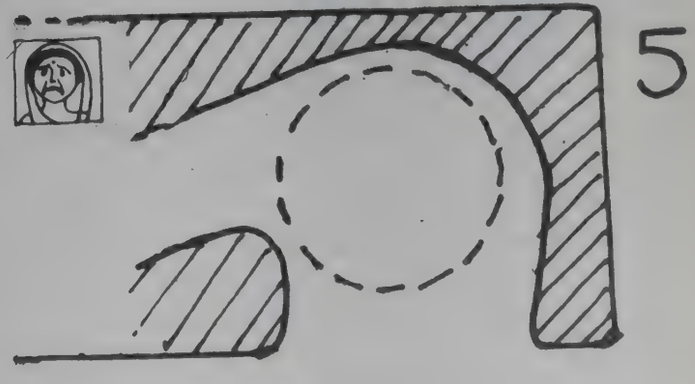
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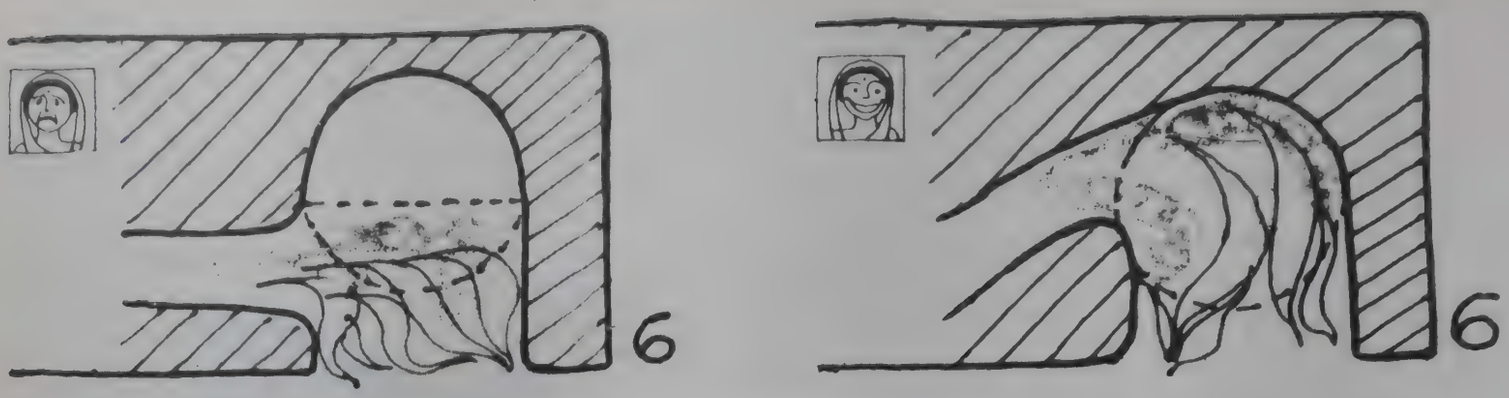
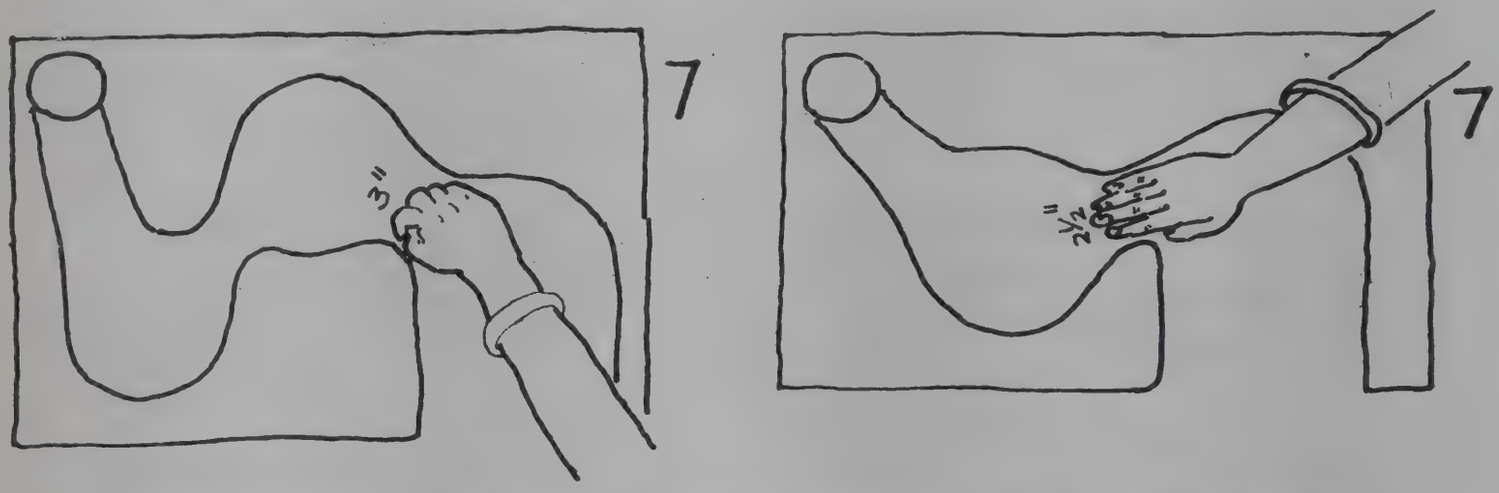
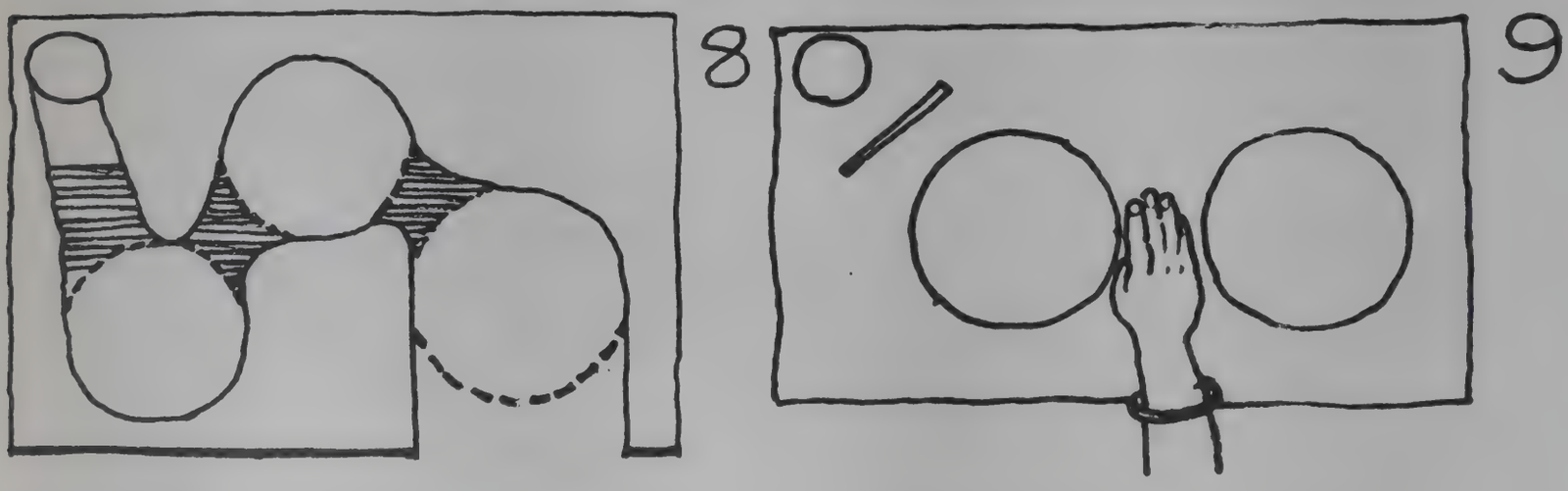
3.5. The final width and depth of the firebox should never be more than the diameter of the hole above it.



3.6. The tunnel from the firebox should start from the back of the firebox. If it starts near the front, hot gases and flames will go away before touching the bottom of the pot.

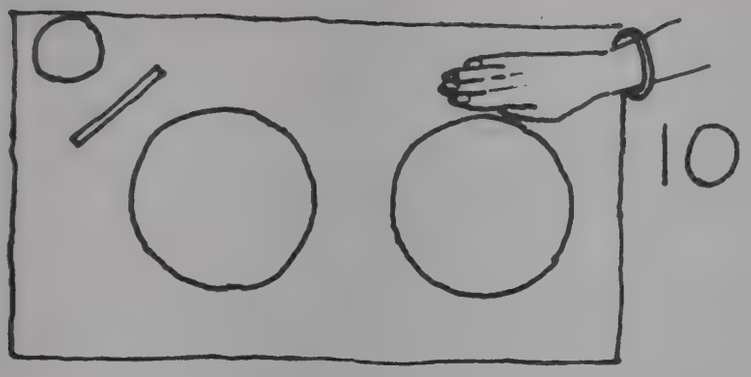


3.7. In a small 2-holed chulha, the final diameter of the tunnel mouth can be only 2½" (62 mm). In a larger, 3-holed chulha, this should be 3 inches (75 mm). While drawing chaapri lines, remember that at least ½" (13 mm) gara has to come on the chaapris yet.

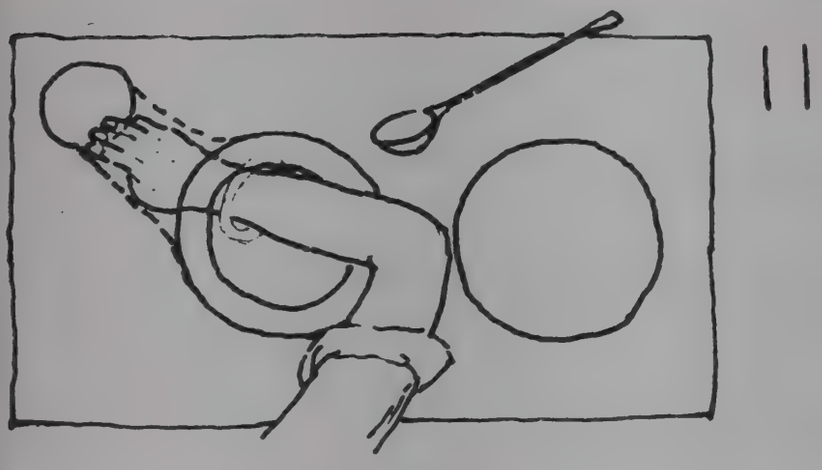


3.8. Make the tunnel wide where cooking holes are to come and narrow in between. Remember, the cooking holes should be as big as possible for the pots.

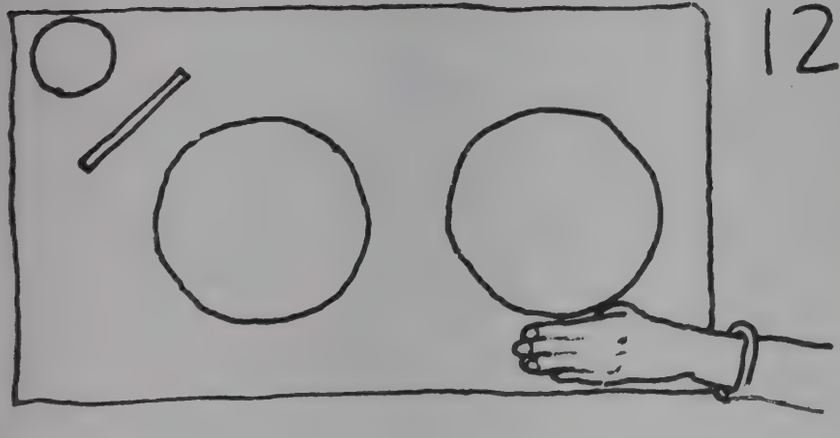
3.9. Keep the distance between cooking holes as small as possible. However, this should not be so small that two pots hit each other when put on the holes at the same time.



3.10. Keep all holes a little away from a wall near the chulha. The pots should not hit the wall.



3.11. Make the tunnel joining the last hole to the chimney short, straight, and wide enough for taking out soot from time to time.

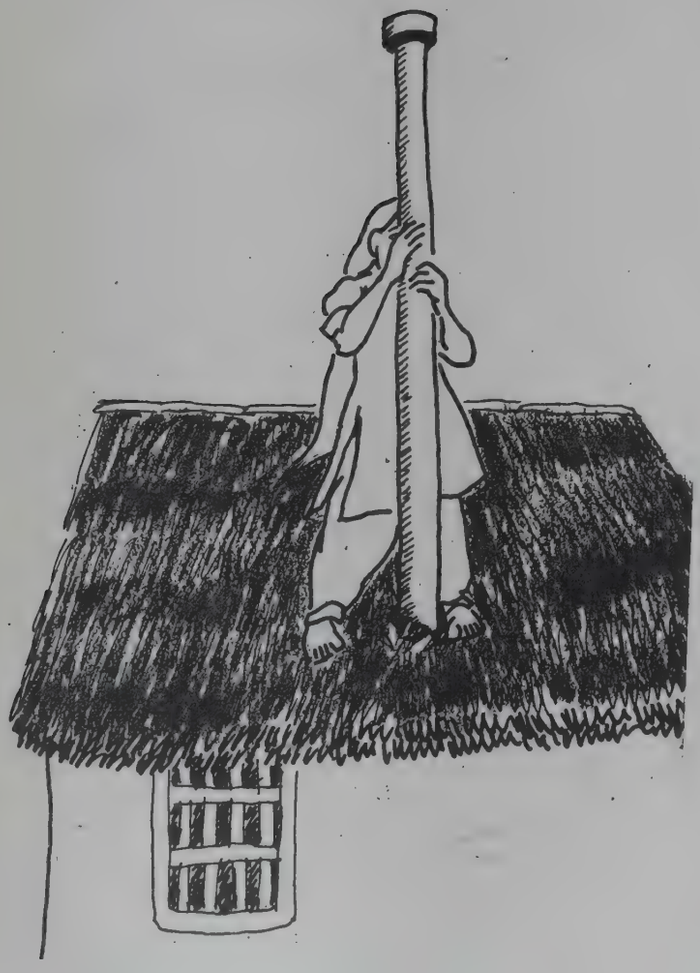


3.12. Make the roof over the mouth of the firebox at least 2″ (50 mm) wide but not more than 3″ (75 mm) wide.

Chapter 5

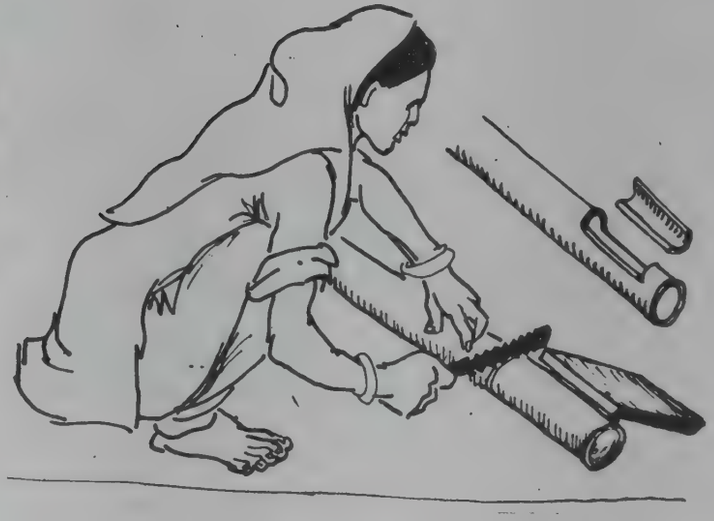
BUILDING THE CHULHA STEP BY STEP

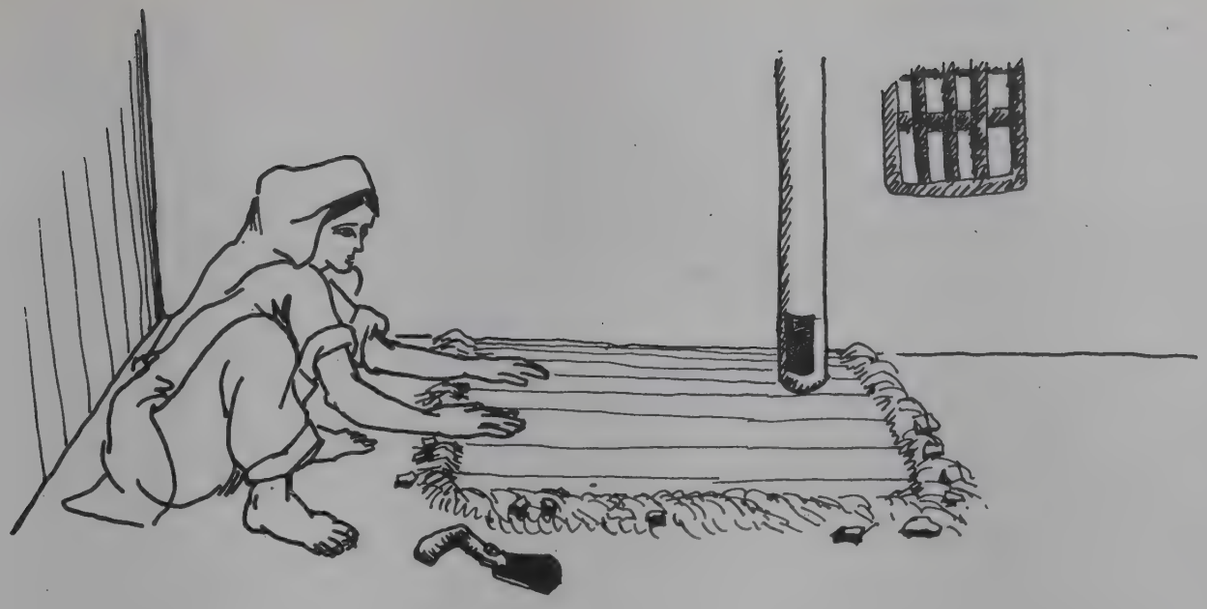
1. You should make it a habit to build each chulha step by step. If you follow these steps, you will not make mistakes. Your chulhas will work well.



1.1. Standing the chimney.

First of all, stand the chimney in position. If you are using an asbestos cement pipe, you should first cut a hole in the chimney to join it with the tunnel.





1.2. Preparing the floor.

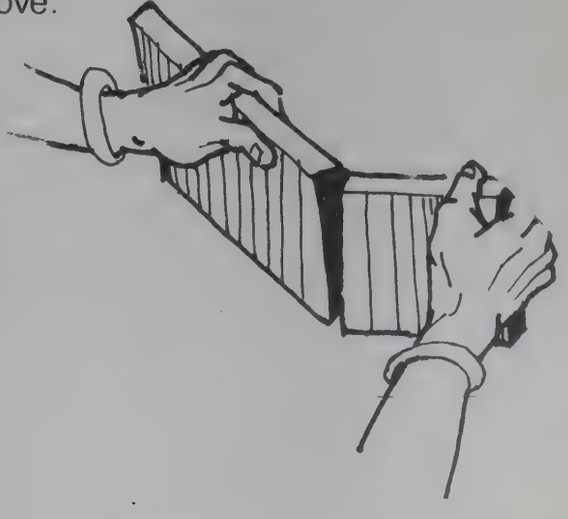
If the kitchen floor is of earth, make it level with a khurpi and sprinkle some water on it.

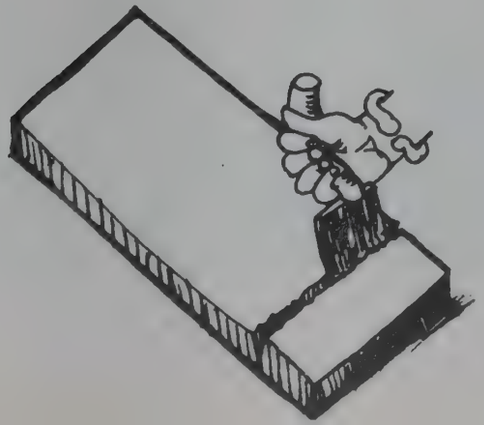
If the kitchen floor is of wood, **you must put a large stone slab under the chulha.** The stone should be so big that even the ashpit can come on it. The stone will not let the floor catch fire. Apply one inch (25 mm) thick gara on the stone.

1.3. Fixing the chaapris.

— First draw the chaapri lines for the chulha around the pots. You can draw the lines with a stick or a knife.

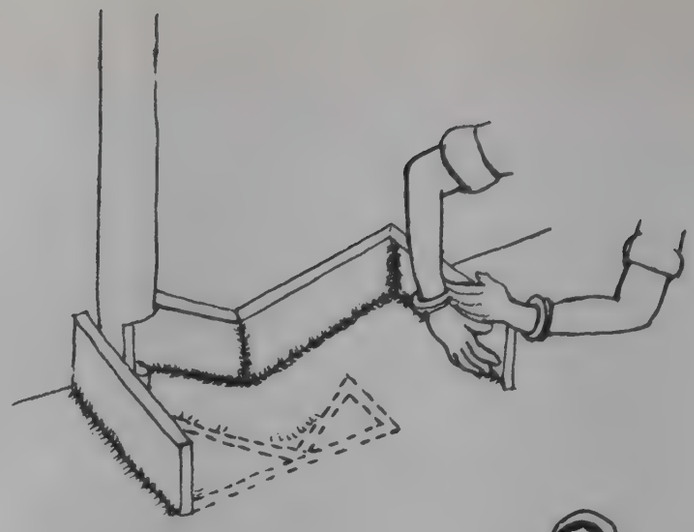
— Then cut chaapris to get pieces of the lengths that are needed. Always cut chaapris by first making a deep groove on the cutting line. Then break the chaapri by bending the two parts away from the groove.





— Dig ½" (13 mm) deep grooves in the floor on the chaapri lines and sprinkle some water on them. Apply some gara into the grooves and press each chaapri piece into position. Apply more gara along both lower edges of the chaapris to fix them nicely to the ground. Side by side, apply gara on both sides of all chaapri joints also.

Always sprinkle a little water on dry chaapris before applying gara on them. This will make the gara hold the chaapris better.

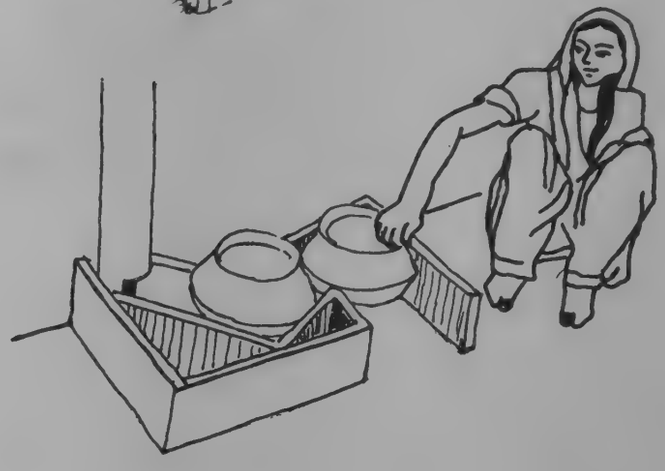


1.4. Are the chaapris fixed correctly?

Before moving to the next step, check if the chaapris are fixed correctly. Do this by keeping pots on all the cooking holes and make sure that :

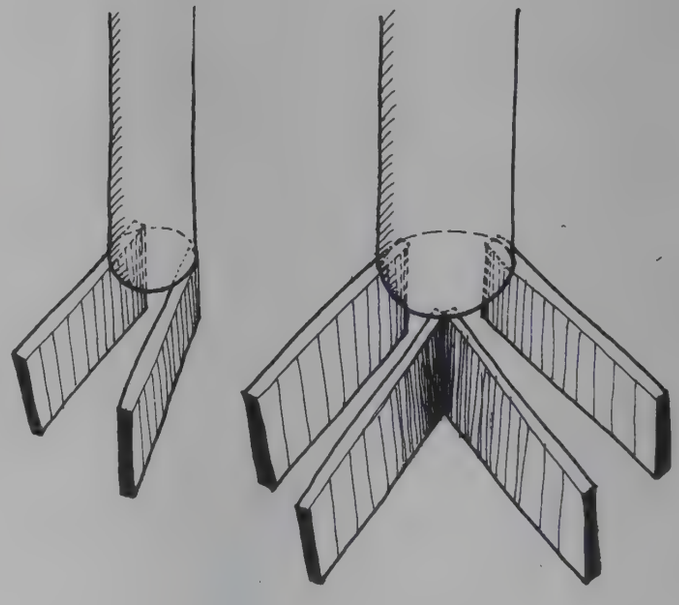
— the pots do not hit each other or the wall.
— the last pot will not hit the chimney damper.
— that the distance between pots is not too much.
— that the tunnel is wide enough under the holes for making big holes.
— that all chaapris are fixed strongly to the floor and at all the joints.

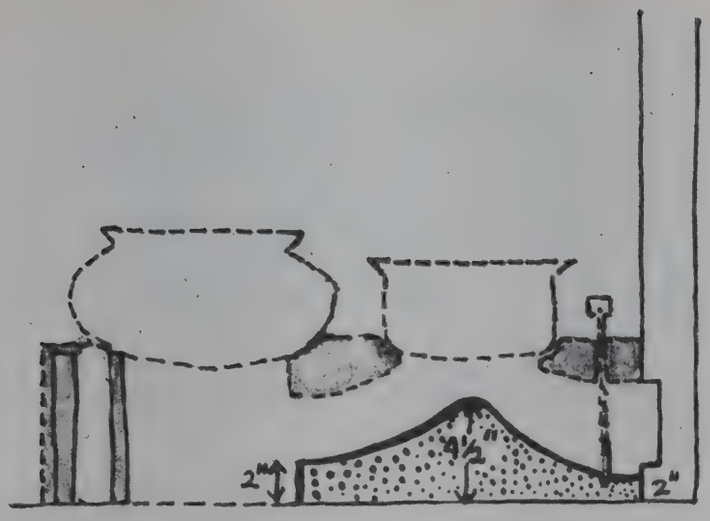
If anything is not correct, it is easy to make changes now.



1.5. Fixing a tin chimney

If you are using a tin chimney, support it on top of the nearest chaapri at this time. Fix it in position with gara.





1.6. Filling dry earth in the tunnel.

Now fill some dry earth in the tunnel. Make this about 2" (50 mm) high at the chimney and firebox ends of the tunnel. Under the middle of each hole, make the dry earth rise to about 4½" (112 mm). Sprinkle a little water on all the dry earth.

1.7. The first stage of gara application.

During this, apply gara on the walls and floors of the firebox and the tunnel. Sprinkle some water on all chaapris before applying gara on them. Round off all corners with gara and give the firebox and the tunnel their final shape. When you have finished, check:

- —that the chimney damper cuts into the gara about ¼" (7 mm) on all three sides. Do this by dipping the damper in water and sliding it in position.
- —that if the chimney is of asbestos cement, gara on the tunnel floor finishes at the same height as the lower edge of the hole in the chimney. If the chimney is of tin, about 2" (50 mm) gara should have been applied on the floor under the chimney.
- —that all chaapris inside the tunnel and the firebox and their floors have been covered with gara.

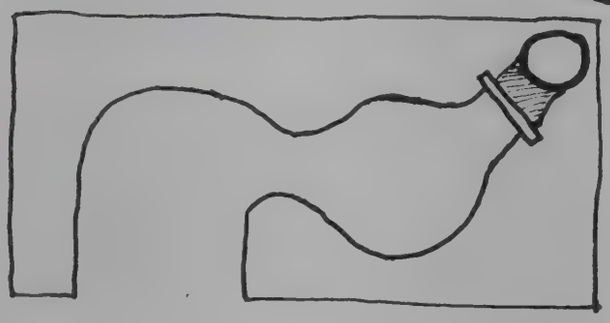
1.8. Rechecking the distance between pots.

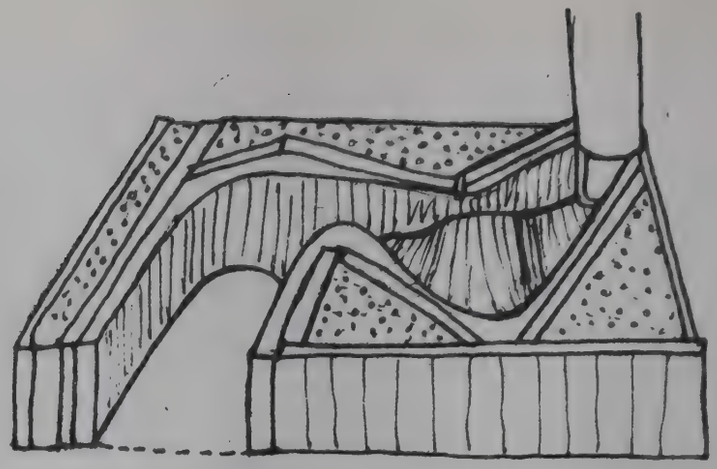
Before moving to the next step, you should check the distance between pots once again by keeping the pots on the holes.

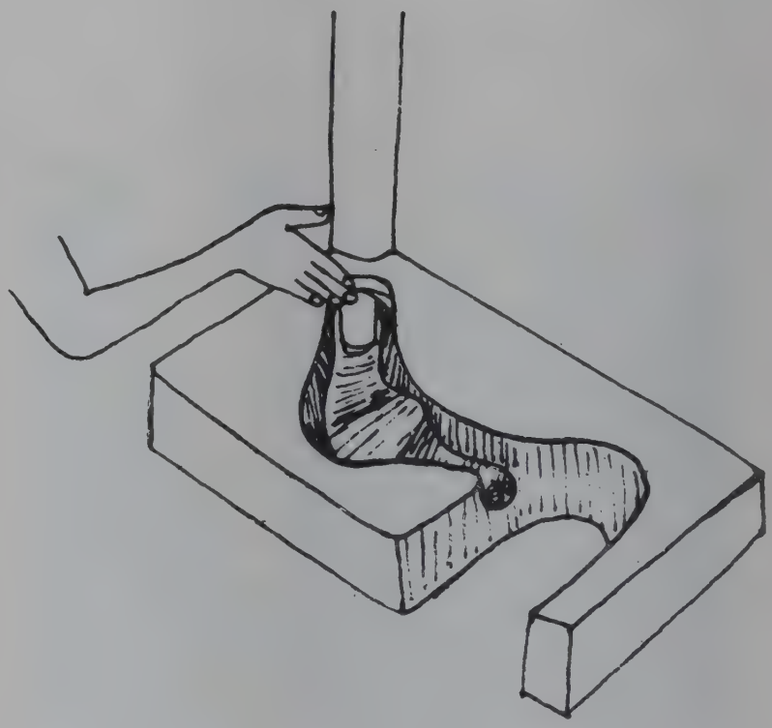
1.9. Filling the hollow spaces.

Now fill all the hollow spaces between chaapris (other than the tunnel and the firebox) with dry earth. Level the dry earth and sprinkle a little water on it.

If the chulha has to be kept hollow cover these spaces from above with pieces of chaapris.





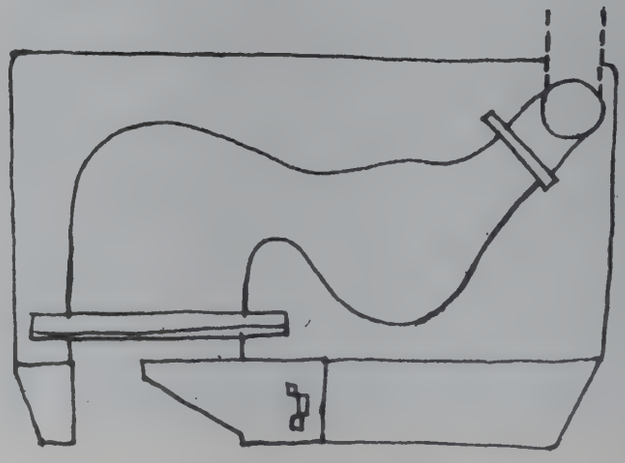


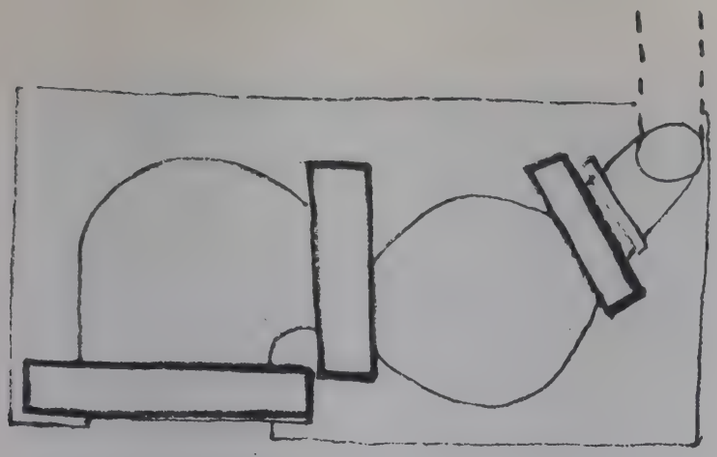
1.10. Making the roof of the tunnel

—Start by roofing the tunnel between the chimney and the chimney damper. Make a slab with stiff gara. Stick this slab to the chimney and over the tunnel.

—Now dip the chimney damper in water and slide it into the tunnel just next to the slab of gara. Completely close the roof between the damper and the chimney with gara.

—Put the iron rod or metal strip over the mouth of the firebox. Place a door of the front dampers in front of the firebox. The metal piece should be at the same level as the top of the damper.





— Now put one short chaapri piece over the tunnel between the chimney damper and the second hole. Put another short piece over the tunnel between the two holes. Put a longer chaapri piece on the metal strip on the firebox mouth. Keep this a little inside from the front of the chulha so that the top guide of the damper will not hit it when that is fixed.
— Put the pots on the holes and make sure that there is enough space between the roof pieces for big cooking holes.

— Fix all the roof pieces in position and round the inside corners of the tunnel with gara. Apply gara even under the roof pieces and make this slope up towards the holes.

— Apply gara more carefully to the firebox roof as this gets the most wear and tear Apply gara firmly into its corners and under the roof and press it in with your fingers.

1.11. The second stage of applying gara.

— Now apply gara on the top and outer sides of the chulha. Make sure that **all** chaapris are covered with at least ½" (13 mm) gara.
— You can make the holes roughly round by keeping pots on them while applying gara on the top, as shown in the photo.
— Give the baffles their final shape.

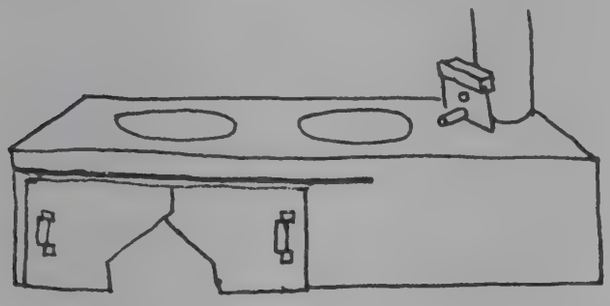
1.12. Shaping the cooking holes.

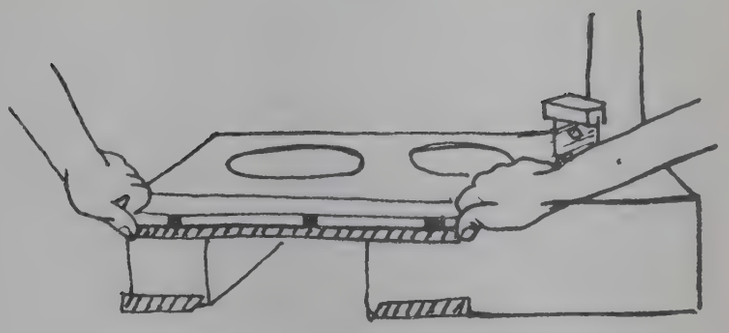
— Do this with the help of pots which are round from below. Keep a wet pot in a hole and press thin gara all around it. Lift the pot and give a better shape to the hole by hand.
— Then again wet the pot from below and put it back in the hole. Rotate it both ways while pressing it down. The pot should sit 1"-2" (25-50 mm) inside the hole.
— Remove the pot. You will be able to see where the pot has rubbed against the gara. Apply more gara at other points and rotate the pot in the hole again. Repeat this till both the upper and lower edges of the hole have become completely round. Shape the lower edge with a smaller pot which has a flat bottom. Rotate this lightly in the hole. By doing this, you will get a completely circular mark on the gara. Remove the gara sticking outside this mark carefully.

1.13. Finishing the chulha

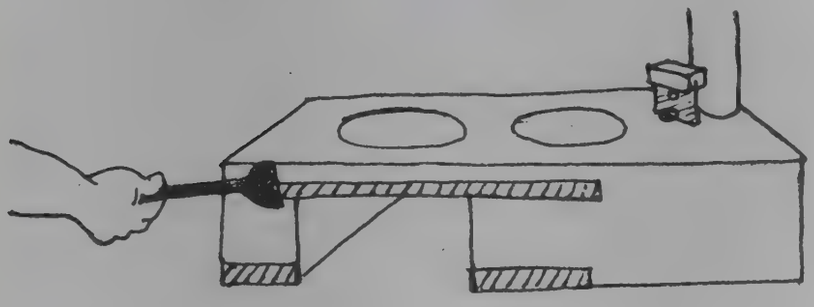
Now finish the top and sides of the chulha neatly. You can do this by gently moving a wet hand on the gara. The front wall of the chulha must be flat and straight so that the front dampers can slide against it easily.

1.14. Fixing the front dampers.

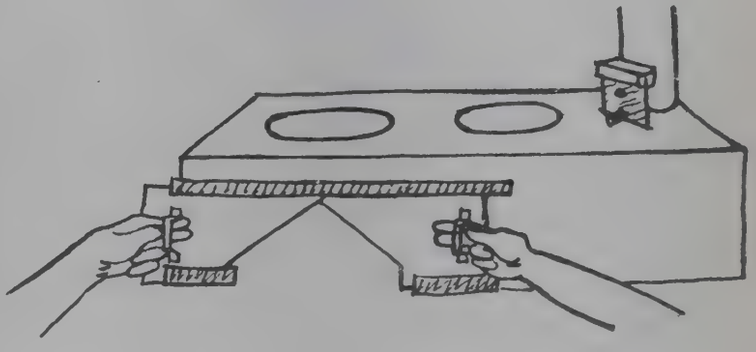




1. Put the damper doors in front of the mouth of the chulha. Mark a line about ⅛" (3 mm) above the top edge of the doors.



2. Press the upper guide into the chulha on this line.



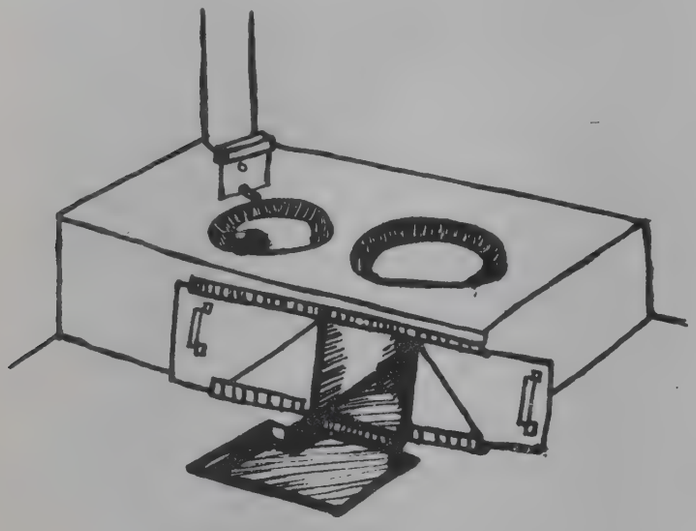
3. Hit the guide gently along its length till there is a gap of only ⅛" (3 mm) between the chulha and the guide. Fix the two lower guides in the same way after keeping the doors in their place.

4. Slide the doors back and forth to make sure that they move freely. Press in some gara under the lower guides to fix them properly.

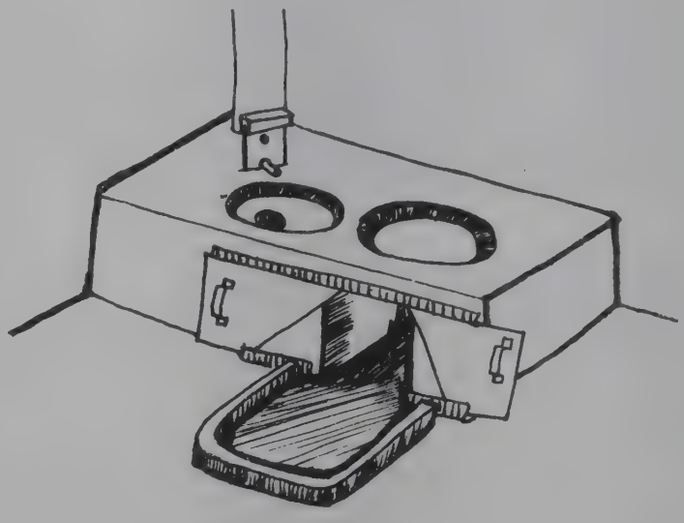
5 Apply a little gara along the upper guide also and give the chulha a neat finish.

1.15. Making the ashpit

The ashpit can be made of different shapes and sizes according to what the owner likes.



—In some areas, the ashpit is dug in front of the chulha. If this is done, explain to the owner that the floor inside the firebox should **not** be dug.

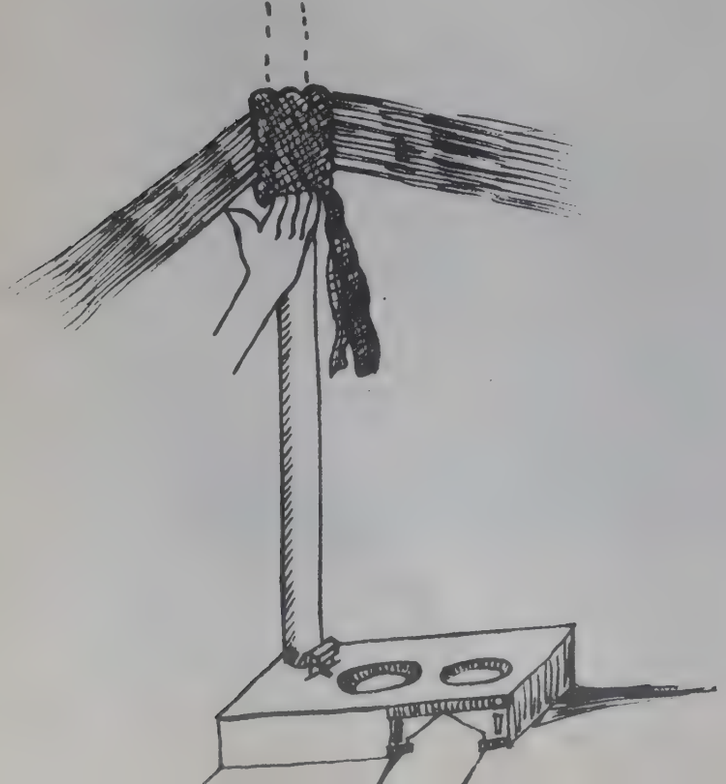


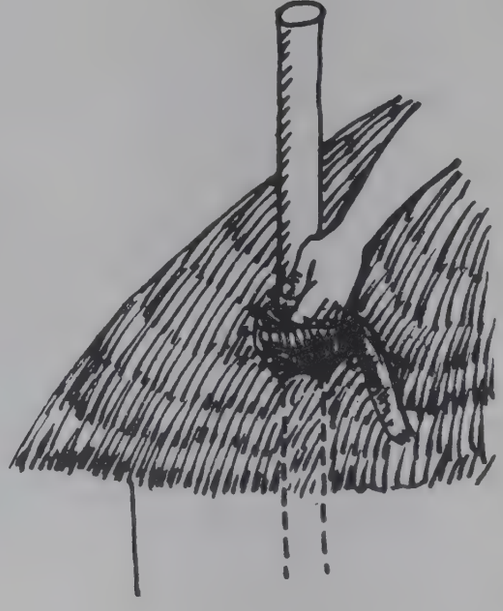
—In some areas, or where the floor is pucca, the ashpit is made by making a ledge with gara.

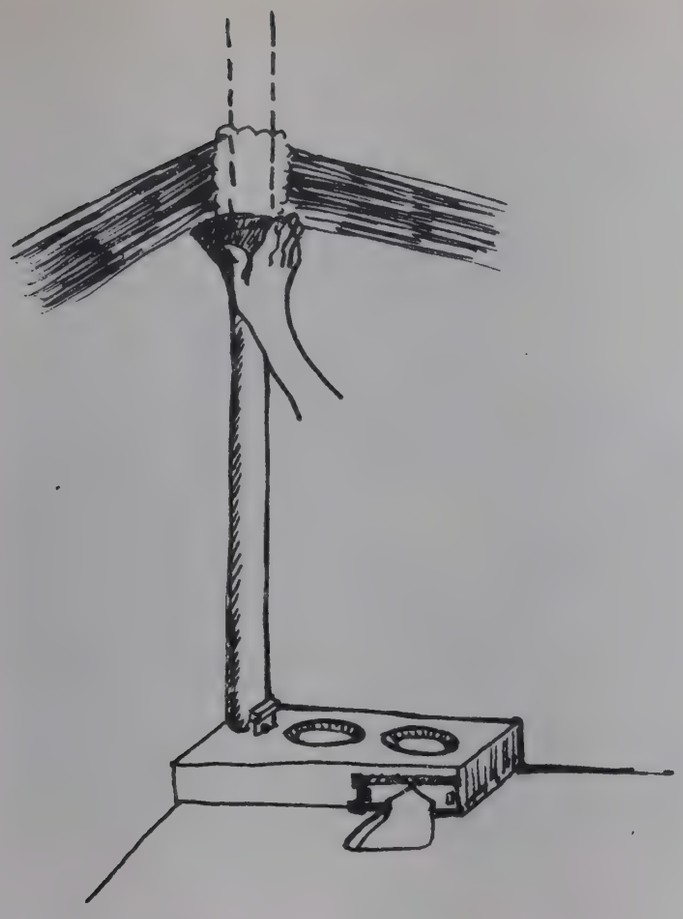
1.16. Closing the gap between the roof and the chimney

Normally, you can leave this to the house owner. However, where the chimney passes through a thatch roof, you should close the gap in the roof yourself. This is to make sure that there is no danger of fire.

—First stuff a waste piece of cloth between the chimney and the thatch all round the chimney. Do this from inside the room, and from the roof outside

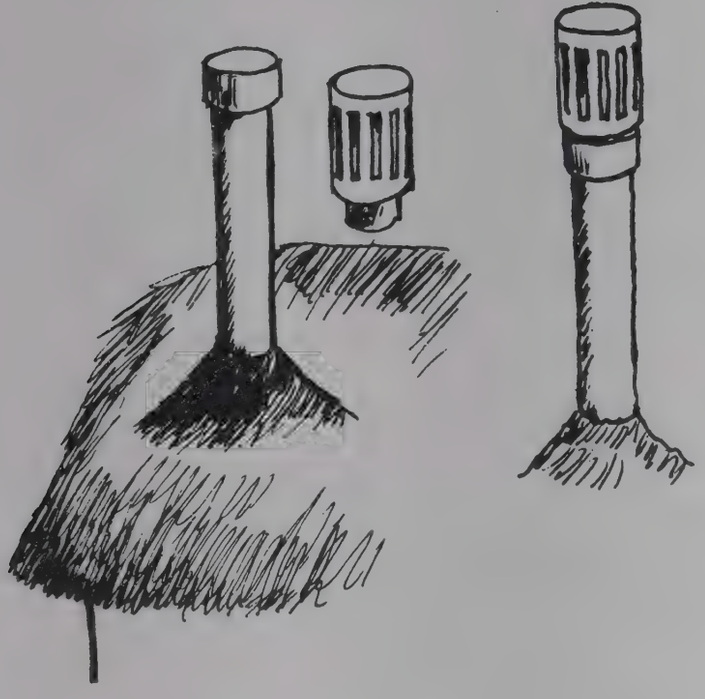






—Then stuff thick gara all round between the thatch and chimney. This is to stop a hot chimney from touching the thatch.
—Finish by applying thick gara around the joint of the chimney and roof so that the gara slopes away from the chimney. Water will not stop near the joint because of this.

1.17. Fitting the cowl.



—In asbestos cement chimneys, a cowl just sits inside the collar.

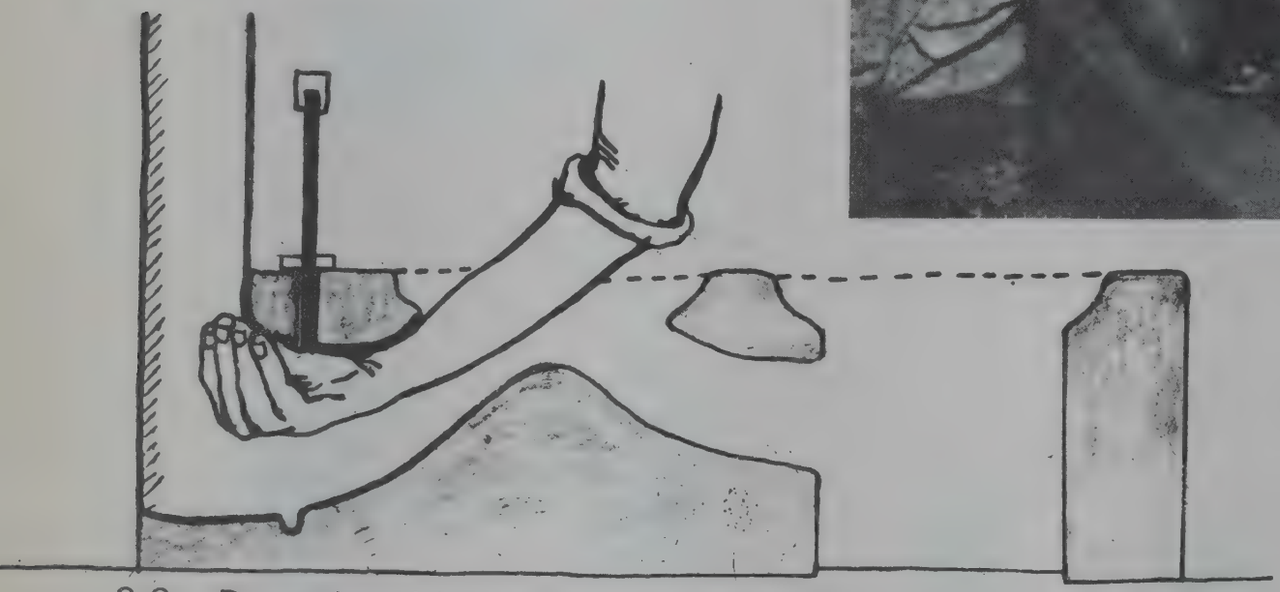
—Even a tin cowl can be fitted inside the collar. If there is no collar, or if the chimney is of tin, only a tin cowl should be used. You can fit this around the mouth of the chimney.

2. A CHECK-LIST FOR THE CHULHA

After finishing a new chulha, you should make it a habit to check some important points once again.

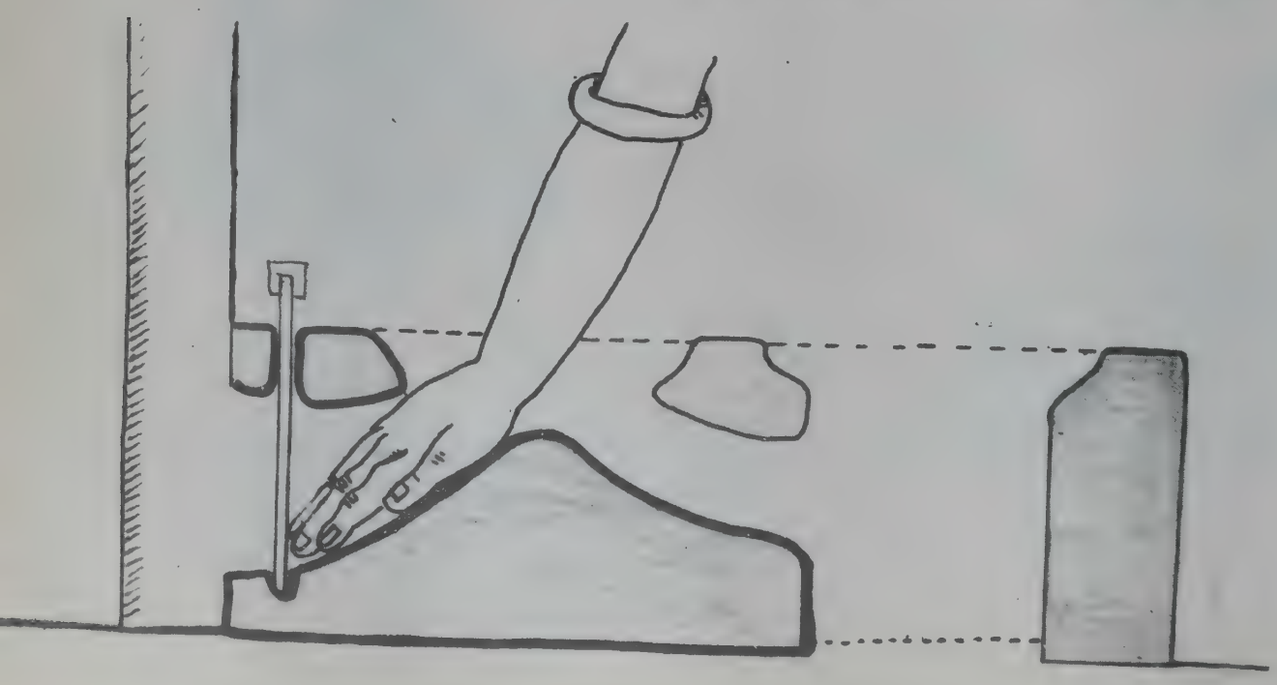
2.1. Is the passage to the chimney clear?

Do this by carefully lifting the chimney damper and moving a hand up the chimney through the last hole. Some gara or dry earth might have fallen inside blocking the passage.



2.2. Does the chimney damper fit the tunnel properly?

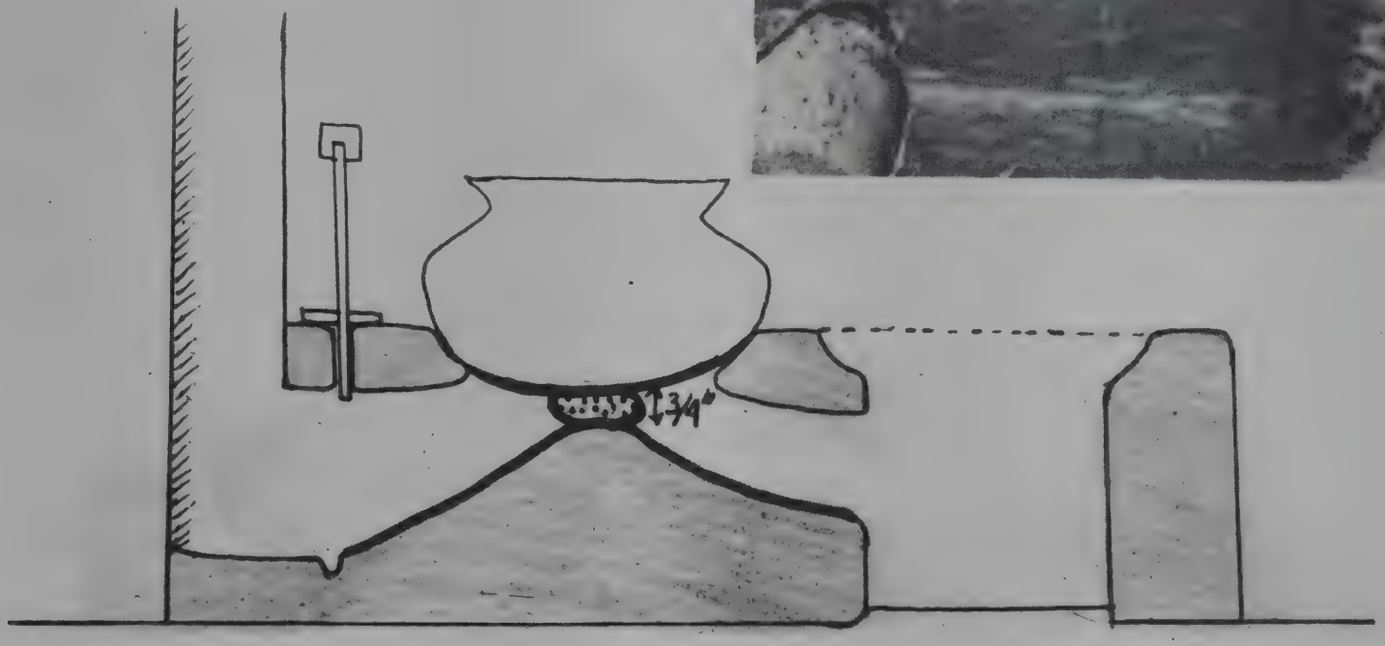
Close the chimney damper fully and move your fingers along all its edges. If there are any gaps between the damper and tunnel walls, floor, or roof, fill them.



2.3 Are all baffels correct?

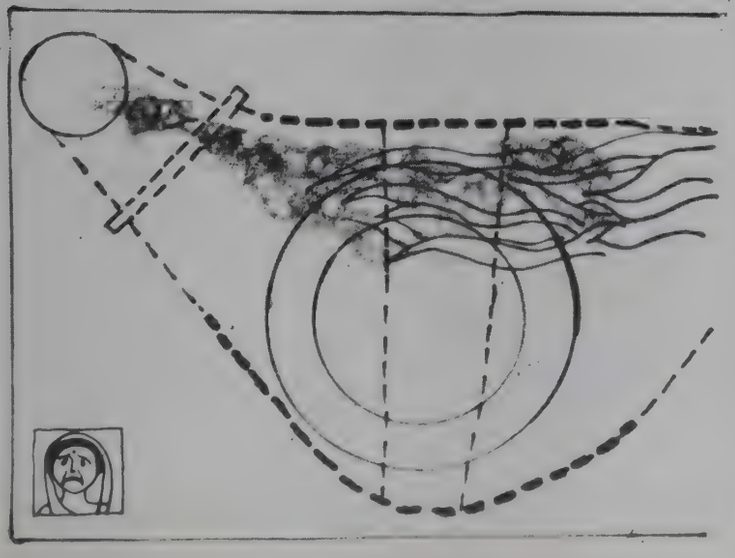
Put a ball of gara in the centre of the baffle and press a pot gently in the hole. The thickness of the squashed gara will be the gap between the baffle and pot bottom. This should be ¾" (20 mm).

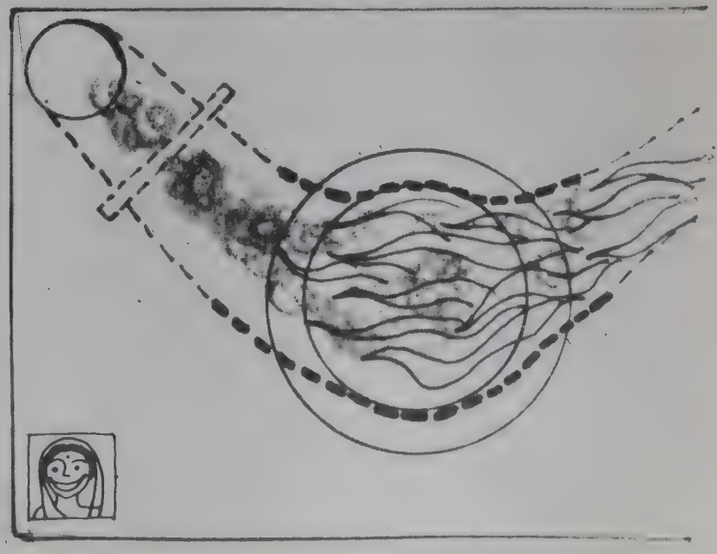
Check the shape of each baffle also. The top of the baffle should be a little flat and should be about ½" (13 mm) higher from one end than the other. The higher end should always be on that side of the path to the chimney which is shorter.



2.4. Is the tunnel width under cooking holes correct?

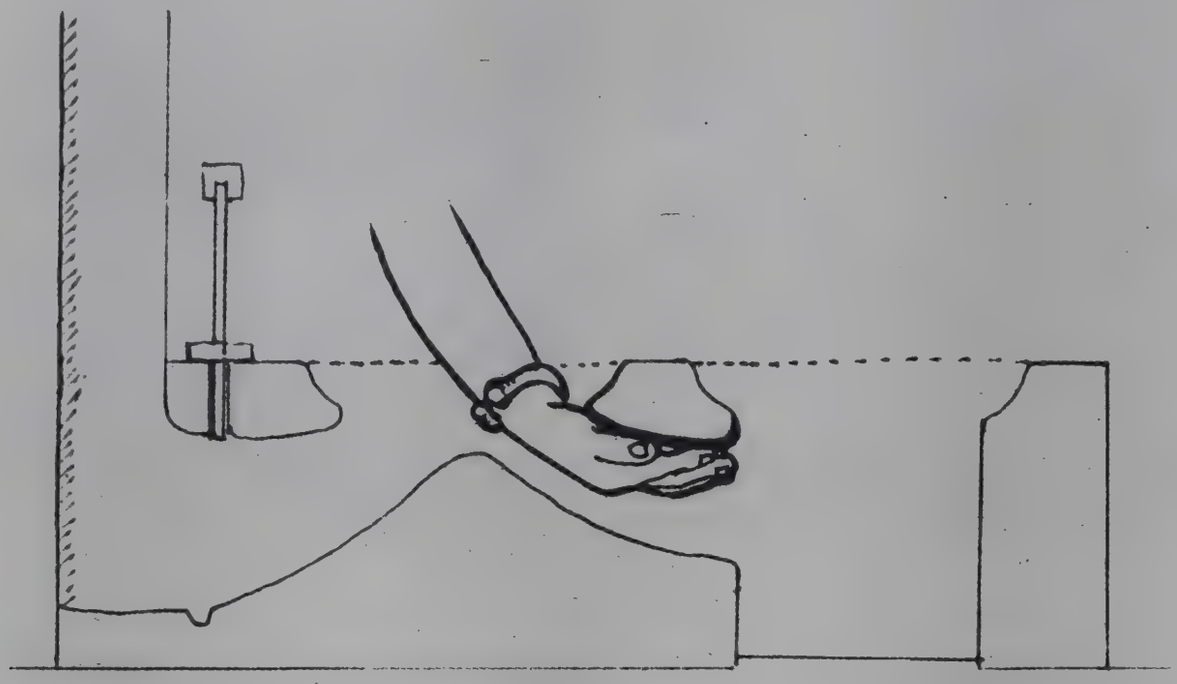
The tunnel under cooking holes should **never** be wider than the hole above





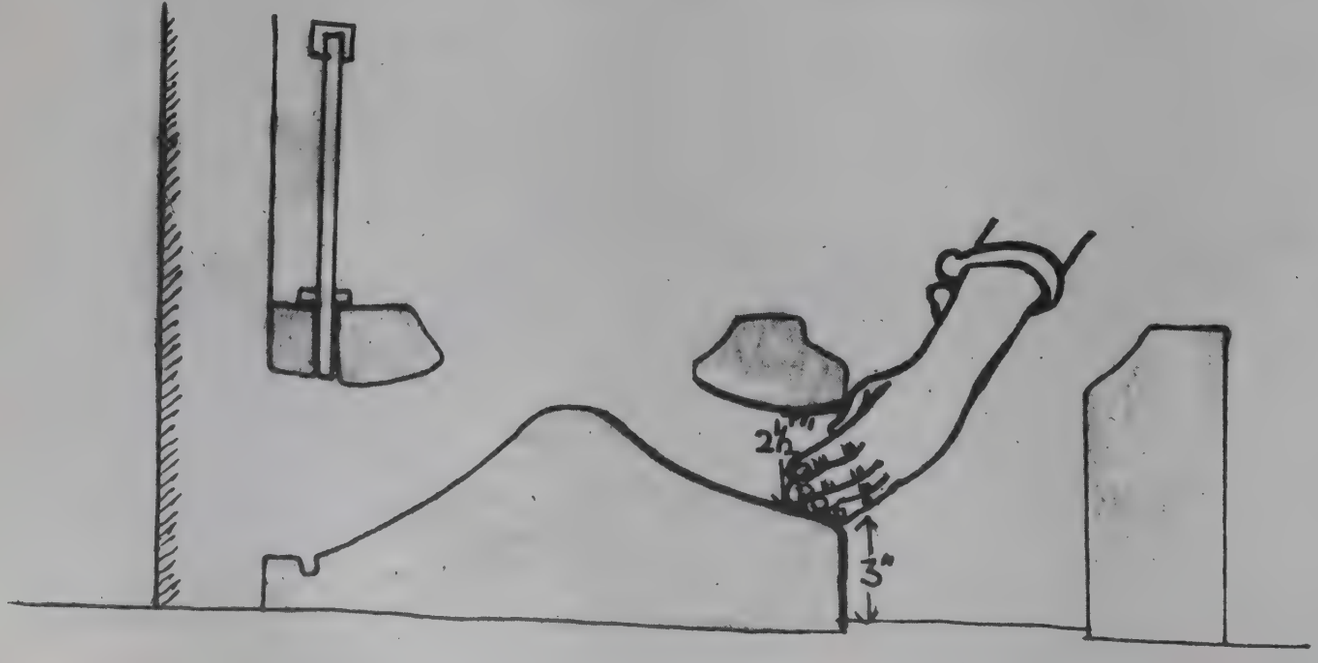
2.5. Is the tunnel roof of correct shape and thickness?

Feel the shape and thickness of the tunnel roof with your hand. Where the tunnel opens into a hole, its roof should also be as thin as possible at these points.



2.6. Is the mouth of the tunnel correct?

The tunnel mouth should start about 3" (75 mm) above the firebox floor. Its diameter should be as described in chapter IV, 3.7.

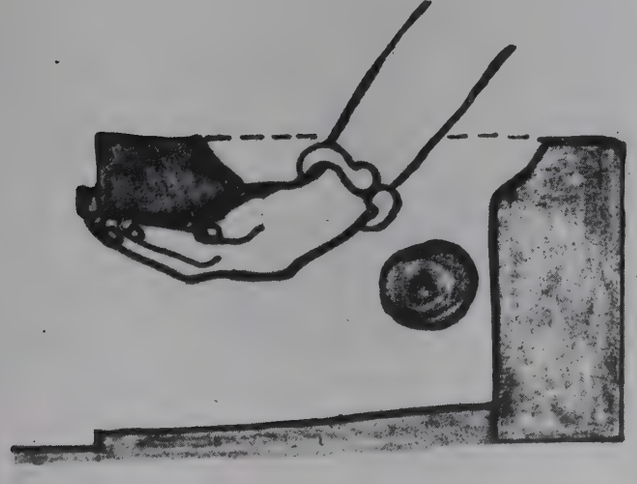


2.7. Is the inside height of the firebox correct?

In areas where mainly fuelwood is used, the height from the firebox floor to the lower edge of the cooking hole should be about 6.5 inches (162 mm). Where dung cakes, agricultural residues or weeds are the main fuel, this height should be kept 7"-7.5" (175-187 mm).

2.8. Is the width and depth of the firebox correct?

Make sure that the width and depth of the firebox are not more than the hole above it.

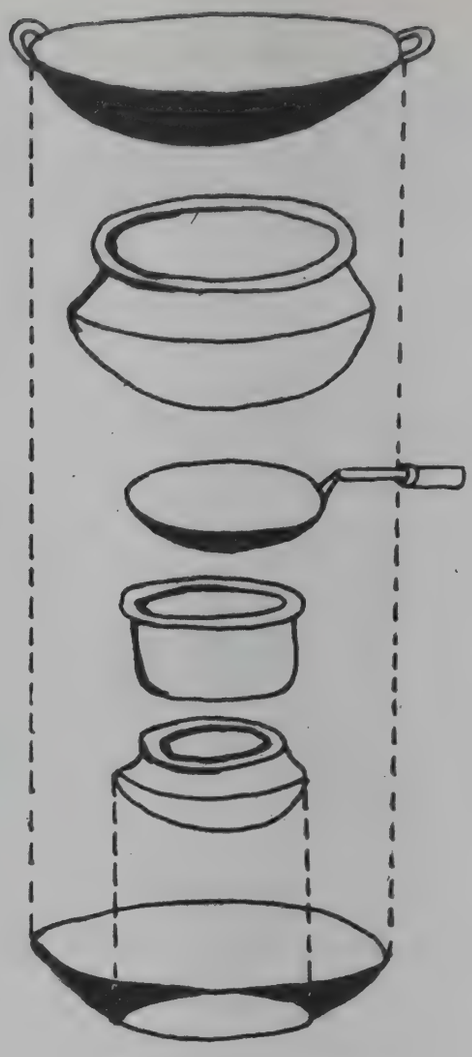


2.9. Is the firebox roof alright?

Check this by opening the front dampers and feeling the firebox roof from below. It should slope up towards the hole.

2.10. Are cooking holes shaped correctly?

Check this by keeping commonly used pots of different sizes on all the holes. There should be no gaps between the holes and any of the pots. The holes should be as big as possible in which pots of different sizes can fit as shown in the drawing.



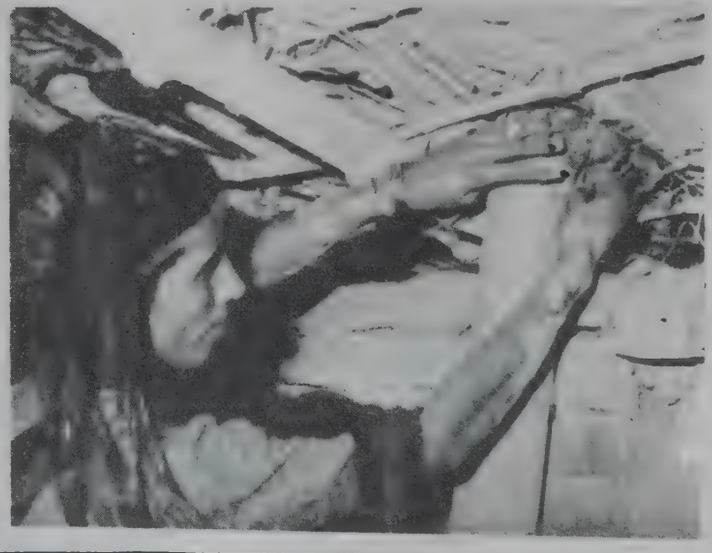
2.11. Are the front dampers fixed correctly?

Open the front dampers and make sure that no gara fell off from inside when the guides were fixed. Slide the doors in and out and make sure they move easily.

Also check that no guide sticks inside the firebox or beyond any wall of the chulha.

2.12. Has mud been stuffed between the chimney and a thatch roof?

You **must** check this if the kitchen has a thatched roof.



2.13. Has the cowl been placed in position correctly?

Remember, it should be possible to remove the cowl to clean the chimney from time to time. The cowl should also not be pushed down so much that all its side openings are closed. If that happens, smoke will not be able to go out of the chimney.

Before you leave the chulha, open the chimney damper completely and the front damper partly. Air moving through the chulha will make it dry more quickly.

Chapter 6

HOW TO MAKE CHAAPRI PLANS FOR DIFFERENT CHULHAS

This chapter tells you how to make chaapri plans for different types of chulhas. It also tells you how to choose a suitable chulha for a family. Rough estimates of the materials you will need, the diameter of the chimney you should use, and the size of the hole to be cut in the pipe, are also given.

Some simple rules for deciding the position of chaapris have already been given in chapter IV (see 3.1 to 3.12). In addition to that, it is useful to divide the chaapris into two groups - outer and inner chaapris.

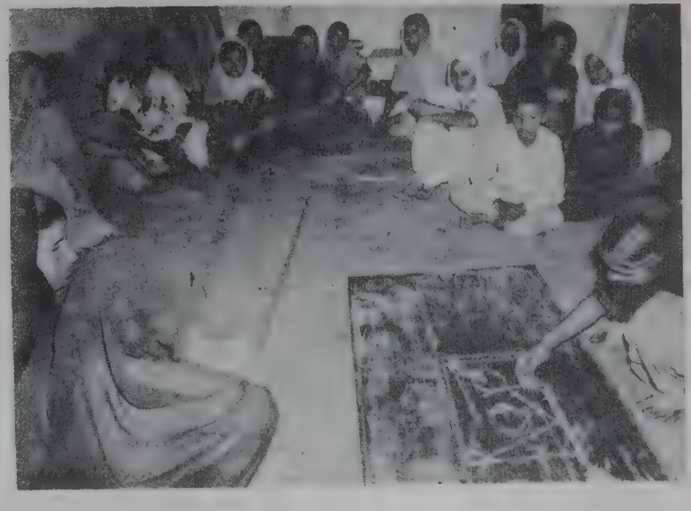
The **outer chaapris** fix the outside shape and size of the chulha. You should always mark the position of the outer chaapris first.

The **inner chaapris** are used to shape the firebox and the tunnel inside the chulha. Inner chaapris have to fit within the outer chaapris. You should decide the position of these with more care following the rules given in chapter IV.

HOW TO USE THE CHULHA PLANS

The rest of this chapter has a number of plans for different types of chulhas. For each chulha, 6 plans are given. The big number on a side of each plan tells which stage is shown in the plan. The line at the top of the plans shows a wall. For some chulhas, 2 or 3 plans have been combined into one.

What each plan shows is explained below using a 2-holed chulha as an example.



1. TWO HOLED SOLID CHULHA

This is the most popular type of chulha in Punjab, Haryana, U.P., Rajasthan and Gujrat. Its two holes can be one beside the other or one behind the other. The chulha can also be made in a triangular shape in a corner. The chimney can be at one end or in the centre behind the cooking holes. Platforms for keeping pots can be built on the sides of the chulha. All its hollow spaces are filled with dry earth.

What is needed for making a 2-holed solid chulha?

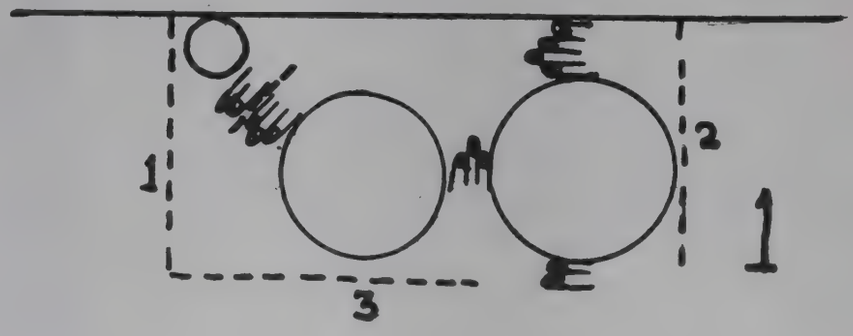
Chimney diameter	:	3 inches (75 mm).
Chimney length	:	kitchen height plus 2 to 3 feet (300-600 mm).
Chimney damper	:	One.
Hole size to be cut in asbestos cement chimney.	:	Width - 3 inches (75 mm) Height - 5 inches (125 mm).
Number of chaapris	:	8 to 9 of 15" × 7" × ¾" (375 × 175 × 18 mm) size with one cut into smaller pieces for making the tunnel roof.
Gara	:	About 3 taslas (baskets).
Dry earth	:	About 2 taslas

1.1: Two-holed solid chulha

Holes one beside the other, cook's sitting position to right of firebox.

Plan 1.

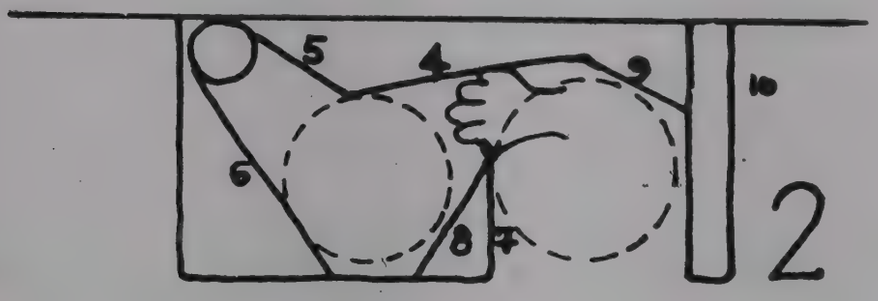
Hole cut in chimney



This shows the chimney and two commonly used pots kept where the firebox and the second hole are to come. The distances you should keep between the holes, between the chimney damper and the last hole, and between the holes and the wall at the back, are shown in fingers.

The dotted lines show the position of outer chaapris. The small numbers next to the lines tell which lines should be marked first and which later. The size and position of the hole to be cut in an asbestos cement chimney is also shown.

Plan 2.



This shows how you should fix the position of inner chaapris. The dotted circles show the position of the holes marked around the pots. Start by marking the chaapri lines for the back wall of the tunnel. First join the outer points of the two holes (line 4). Then draw a straight line joining the outer point of the second hole to the outside of the chimney (line 5). After that, join the other side of the chimney to the outer point of the second hole on the front side (line 6).

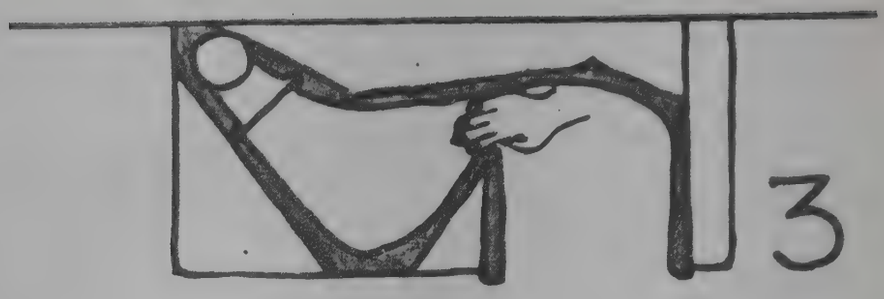
Then mark the inside wall of the firebox (line 7). Remember, the width of the firebox should be kept 1"-1½" (25-37 mm) more than the diameter of the hole to come above it. This is for the gara yet to be applied on the chaapris. The length of the inside wall of the firebox is decided by the width of the tunnel mouth. The width of the tunnel mouth is shown by a closed fist of a small hand (about 4" or 100 mm). Join the end of line 7 to the outer point of the second hole (line 8). Draw a small line (no. 9) in the right hand corner of the firebox. This will help you make the firebox corner round with less gara.

Now only one more line is needed (no.10). Make this parallel to line 2 and about 2" (50 mm) away from it. This chaapri will make the side wall of the chulha wide enough for the front damper to slide against it.

Cut chaapris to the required lengths and fix them in these positions, as explained in 1.3 and 1.4, chapter V.

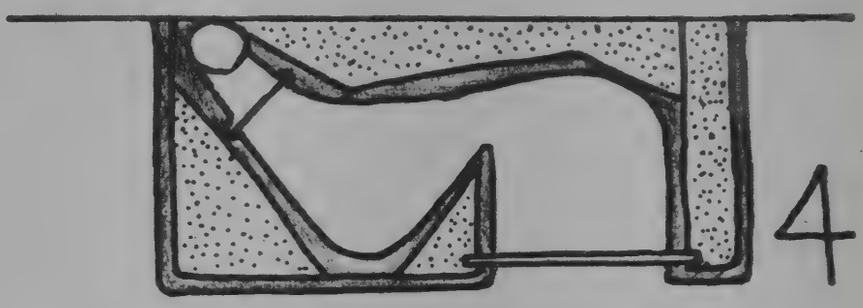
Plan 3.

This shows gara applied inside the tunnel and the firebox as explained in 1.7, chapter V. All corners have been made round. The thickness of gara has been shaded grey. The chimney damper is cutting into the gara on both walls of the tunnel. The finished mouth of the tunnel is 4 fingers wide (about 2½" or 63 mm)



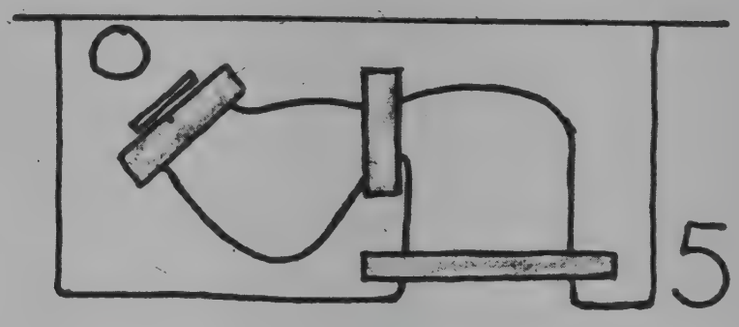
Plan 4.

This shows dry earth filled in the hollow spaces as explained in 1.9, chapter V. Dry earth has been shown with dots. A metal strip for making the firebox roof more strong is shown kept over the mouth of the firebox.



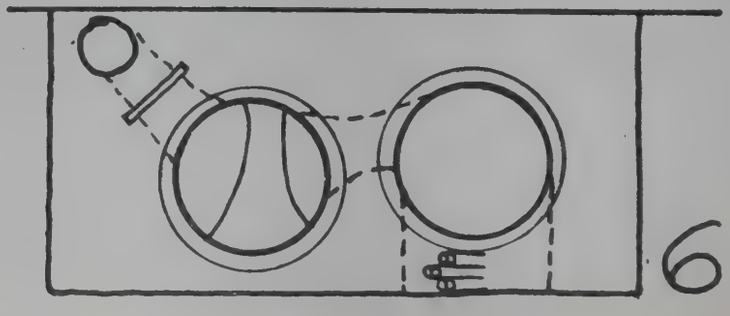
Plan 5.

In this, the tunnel roof between the chimney and the chimney damper has been closed and three pieces for roofing the tunnel and the firebox have been kept in their positions. (see 1.10, chapter V).



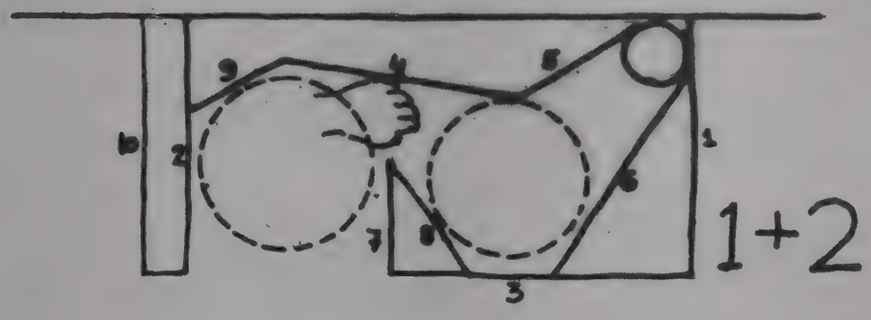
Plan 6.

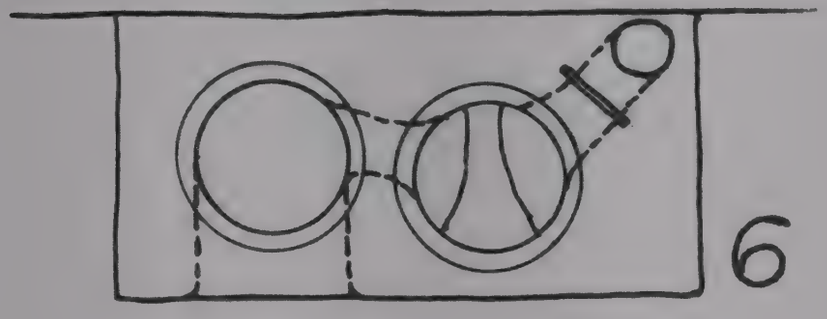
This shows the finished chulha from above. The baffle inside the second hole is shown. Dotted lines show the inside shape of the firebox and the tunnel.

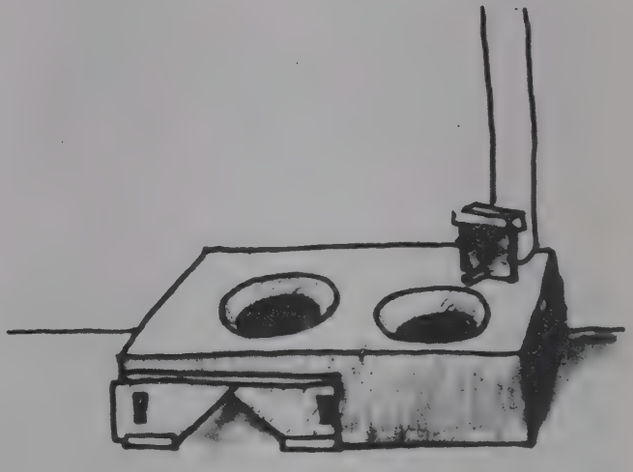


1.2. Two-holed solid chulha.

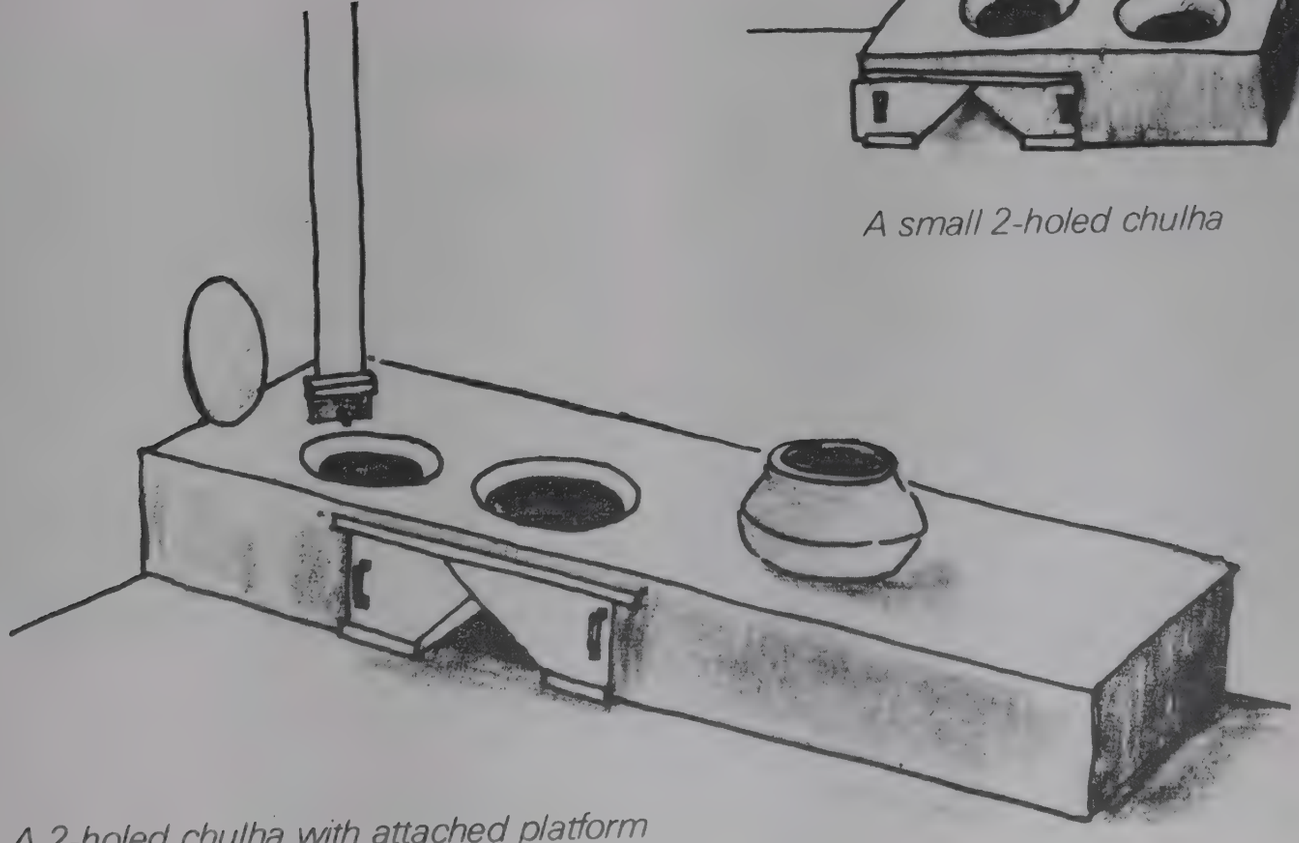
Holes one beside the other, cook's sitting position to left of firebox.







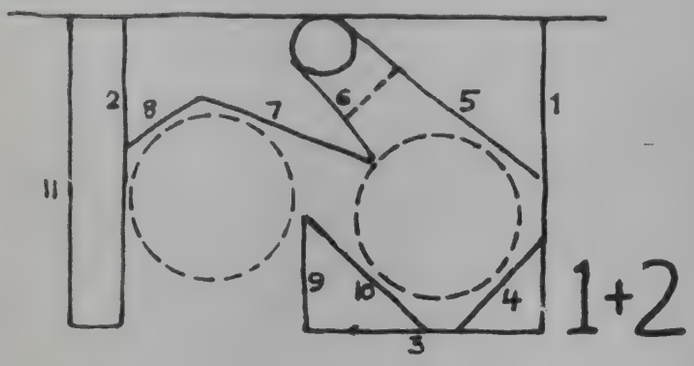
A small 2-holed chulha



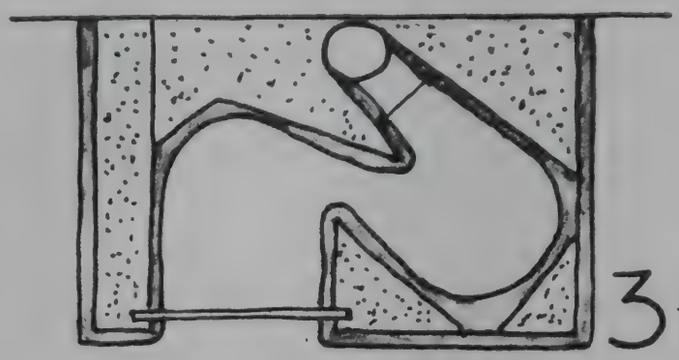
A 2-holed chulha with attached platform

1.3. Two-holed solid chulha.

Holes one beside the other, chimney in centre.



1+2



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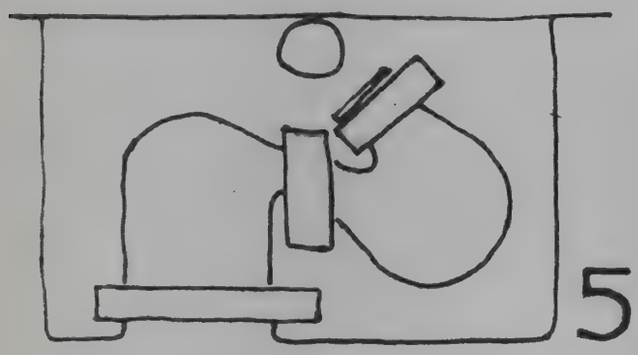

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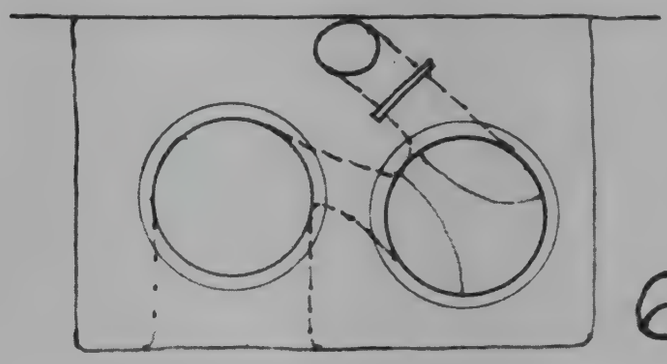

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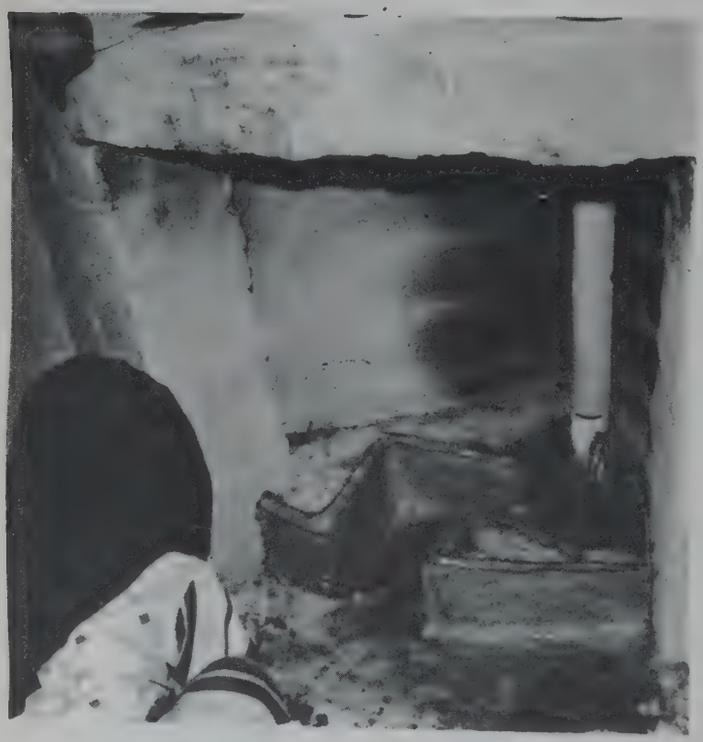
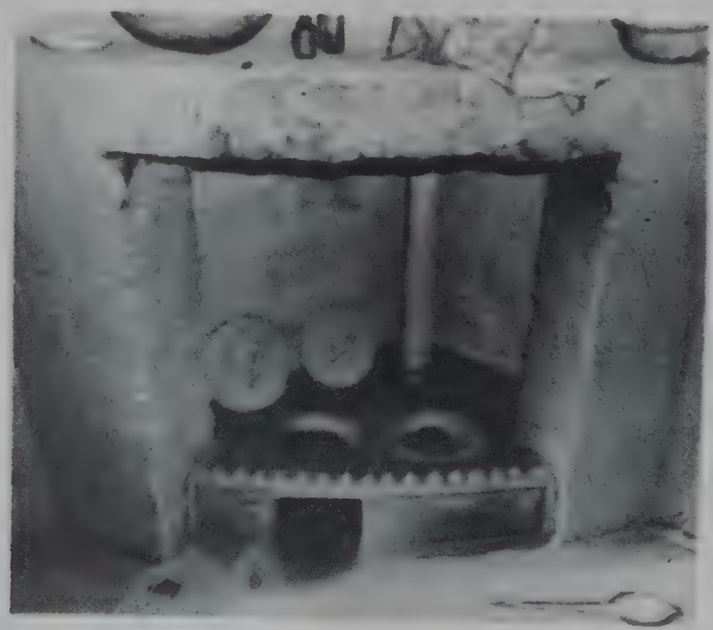


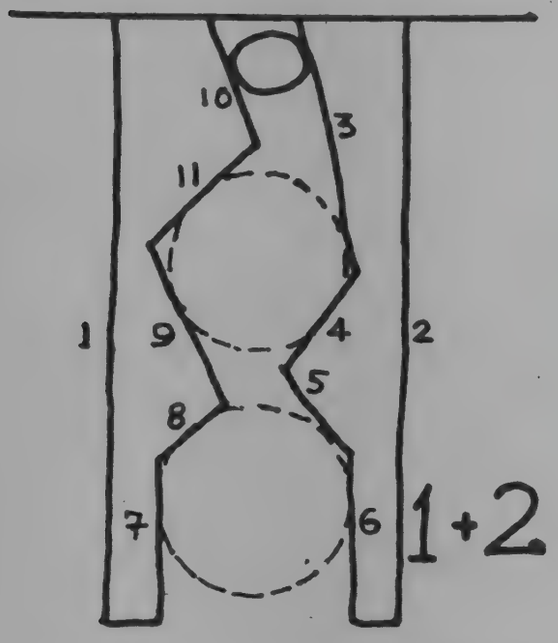
Chaapri layout of a 2-holed chulha in a corner.

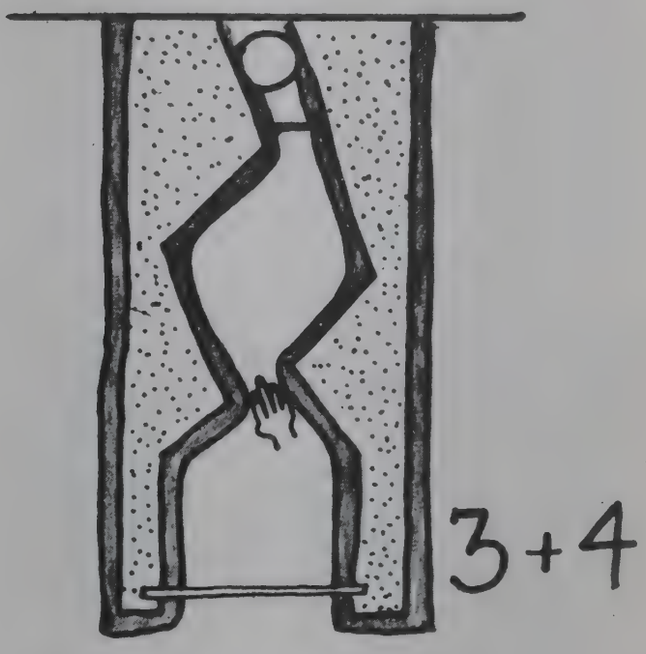


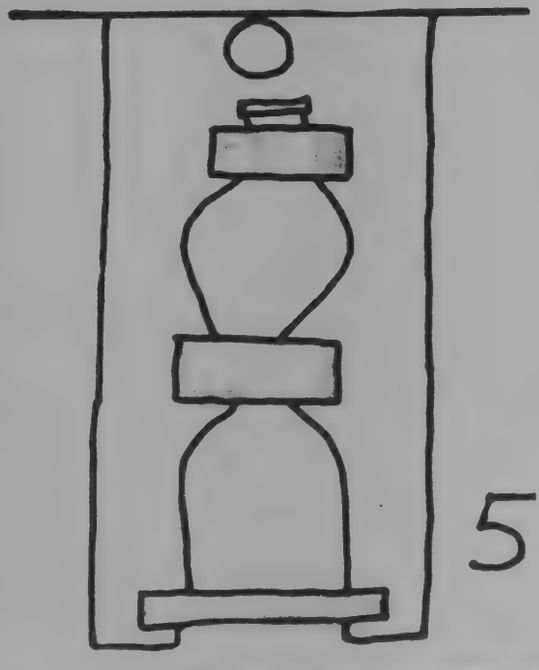
The same chulha when finished.

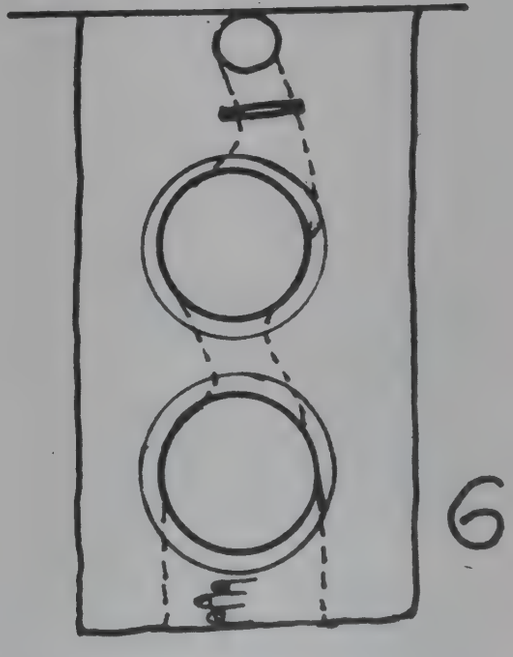
1.4. Two-holed solid chulha.

Holes one behind the other cook's sitting position on either side of firebox.







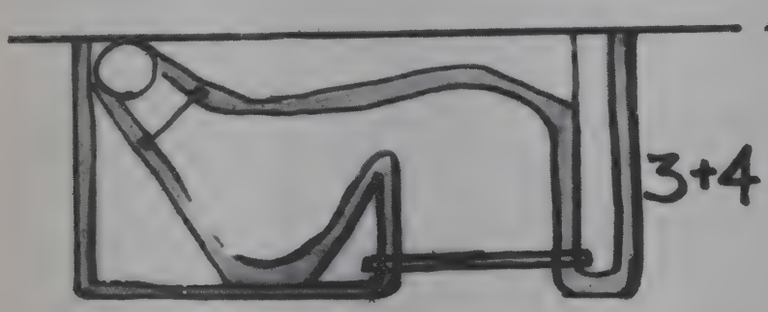


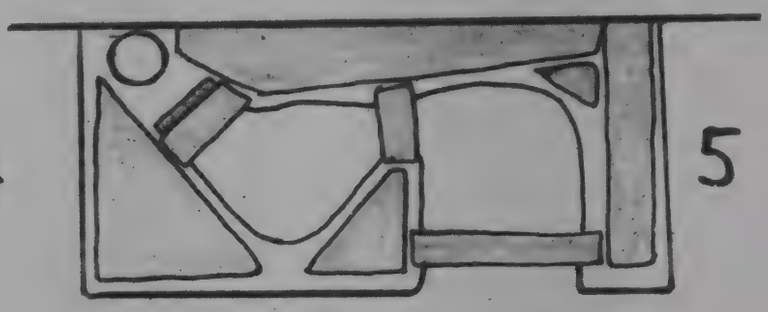
COMMUNITY HEALTH CELL

2. TWO-HOLED HOLLOW CHULHA.

With the Nada Chulha construction method, you can keep the dead spaces of any chulha hollow. Instead of filling dry earth into them, you can just cover them with chaapri pieces. How to build a 2-holed hollow chulha is shown in the plans and the photo. You have to be careful about one thing while building a hollow chulha. If any of the hollow spaces is too wide, you should stand one or two more chaapri pieces in it to support its roof properly.

You should build hollow chulhas for small families whose food gets cooked fast and who cook only two or three times in the day. Because much less mud is used in making hollow chulhas, they become hot quickly. They also save more fuel.





Chaapris	:	9 to 10 of 15" × 7" × ¾" (375 × 175 × 20 mm) size with two cut into smaller pieces for making the roof.
Dry earth	:	About ½ tasla.
Everything else as for a 2-holed solid chulha.		

A hollow chulha ready for closing from above. The finished chulha will look like a solid chulha.

Two traditional haras

A pit dug on the right side of the chulha for a hara

The hara finished at the same level as the chulha

3. TWO HOLED CHULHA WITH HARA.

A *hara* is a special type of old chulha. It is used in Punjab, Haryana and western U.P. for heating milk slowly. The milk pot is kept on a slow fire of dung cakes inside the hara. Smoke passes around the sides of the pot and goes out from the top. Many people cook even lentils and spinach in the hara. They like the special taste given by a slow, smoky fire. Haras are dug into the ground or built above ground. Thick smoke comes out of haras for many hours every day.

You can easily join a hara to the chimney of a 2-holed chulha. As the pot has to be taken in and out of the hara, keep its inside diameter at least 2 inches (50 mm) more than that of the milk pot. If your hara is to finish at the same level as the chulha, you will have to dig a small pit for it. Keep the inside height of the hara about 6 inches (150 mm) more than the height of the milk pot.

You will have to make a tunnel near the top of the hara to connect it to the chimney. Cut another hole in the chimney at that level. Fit a chimney damper in the middle of this tunnel. When the hara is covered, all its smoke goes out through the chimney. Nada Chulhas with haras have become popular in Punjab, Haryana and Himachal Pradesh.

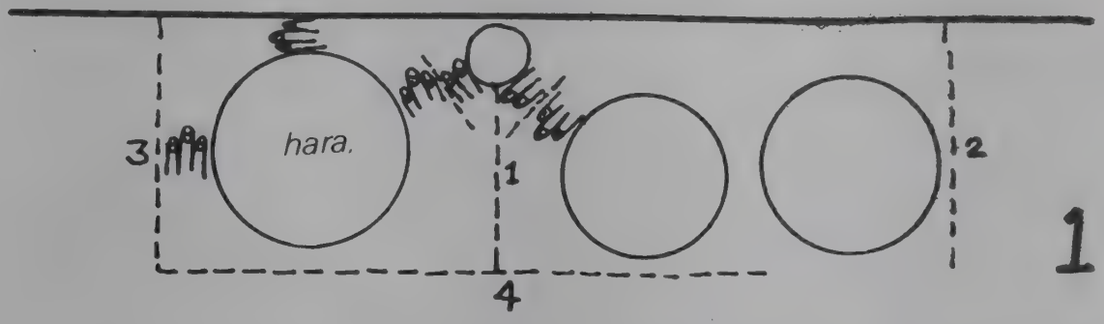
The hara closed with a mud cover.

3.1. Two holed chulha with partly sunk-in hara.

Chimney diameter	:	3 inches (75 mm) or 4 inches (100 mm).
Chimney dampers	:	Two.
Hole to be cut in A.C. chimney	:	One large hole 8 inches (200 mm) wide and 5" (125 mm) high.
Chaapris	:	12 to 13 of 15" × 7" × ¾" (375 × 175 × 20 mm) - size with one cut into smaller pieces.
Gara	:	About 5 taslas.
Dry earth	:	About 3 taslas.

The chulha and hara being roofed (above), and, the finished chulha with hara (below)

Two holed chulha with partly sunk-in hara.



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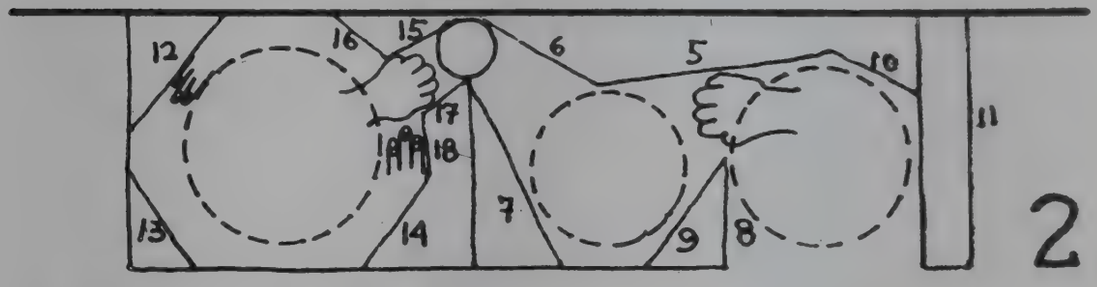
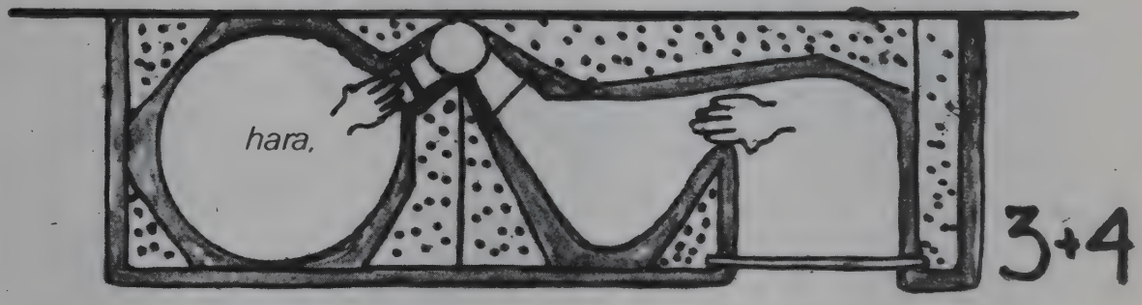


2

hole cut in chimney



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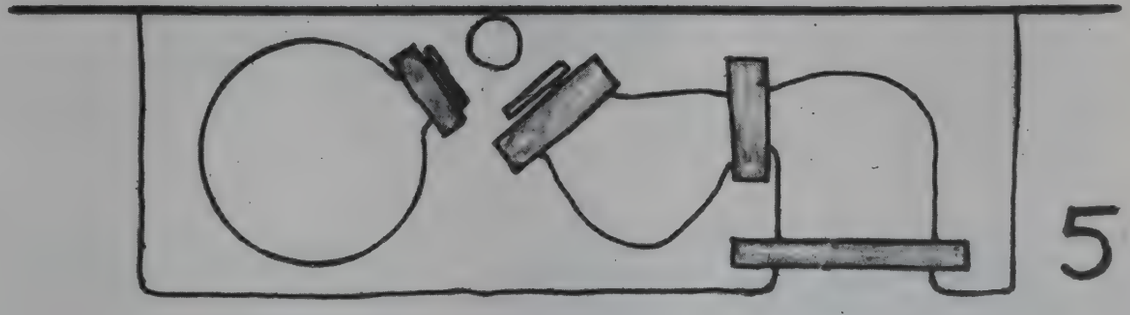

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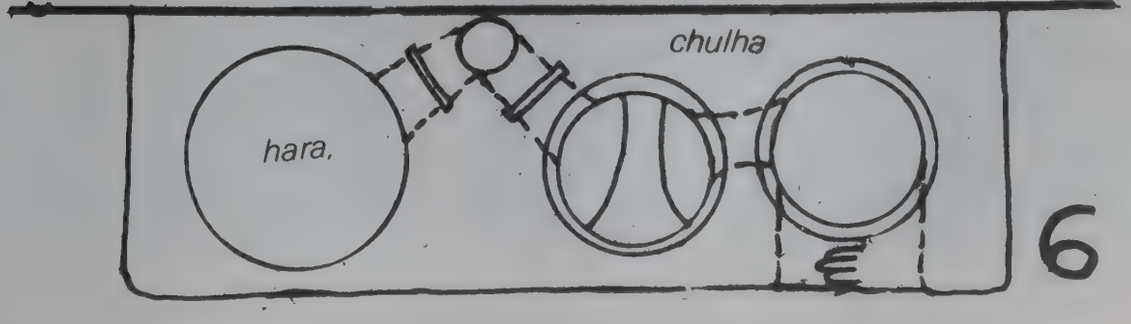
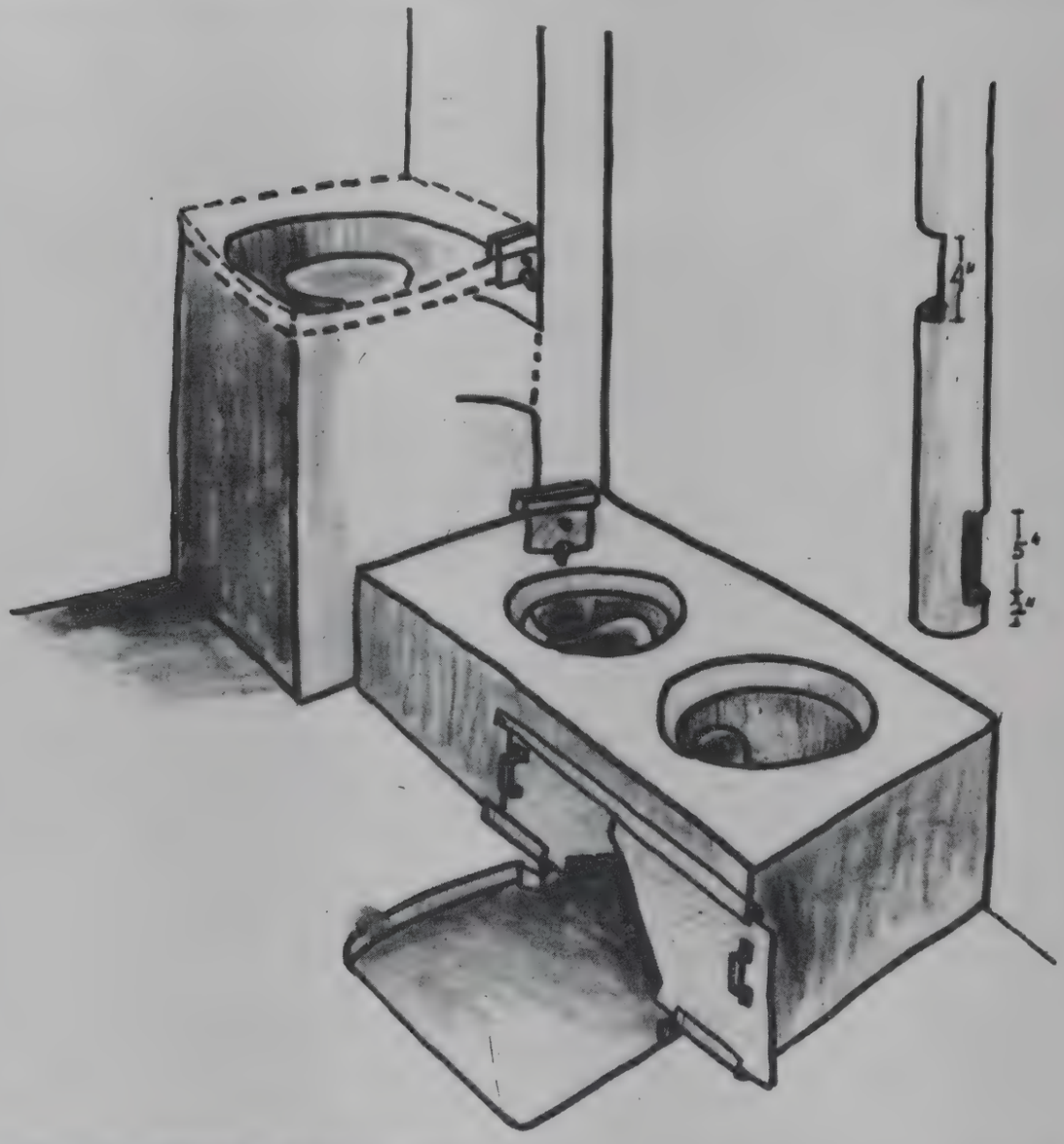
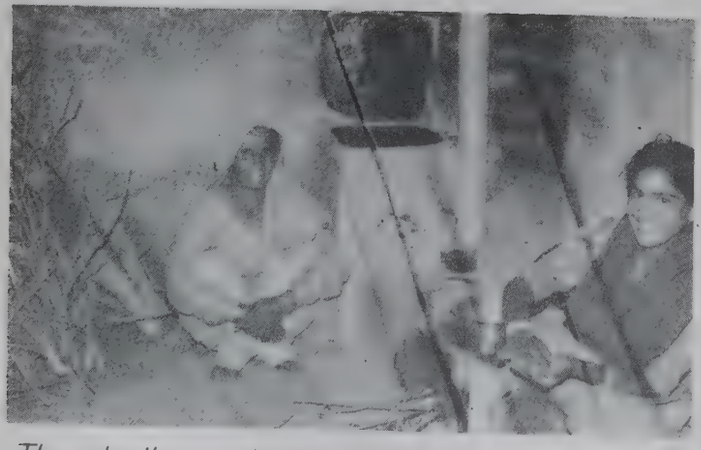


6

3.2. Two-holed chulha fixed to an old hara above ground.

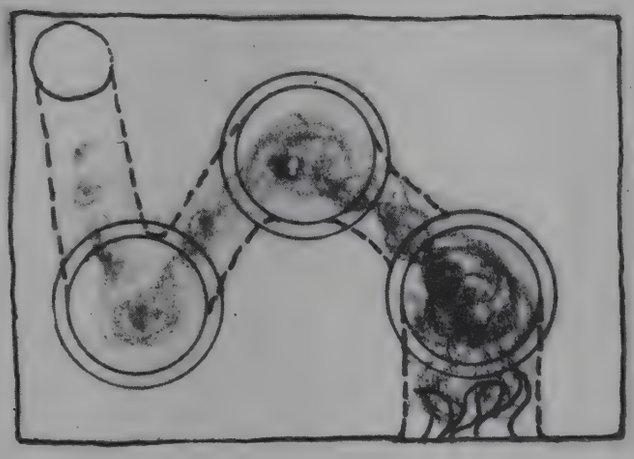
Many women want to connect their old haras to the Nada Chulha. You can do this easily by cutting another hole in the chimney just below the top of the hara. You will also have to cut a hole in a wall of the hara. This should be where the hara is to be joined with the chimney.





The chulha and hara shown above with the hara cover kept open.

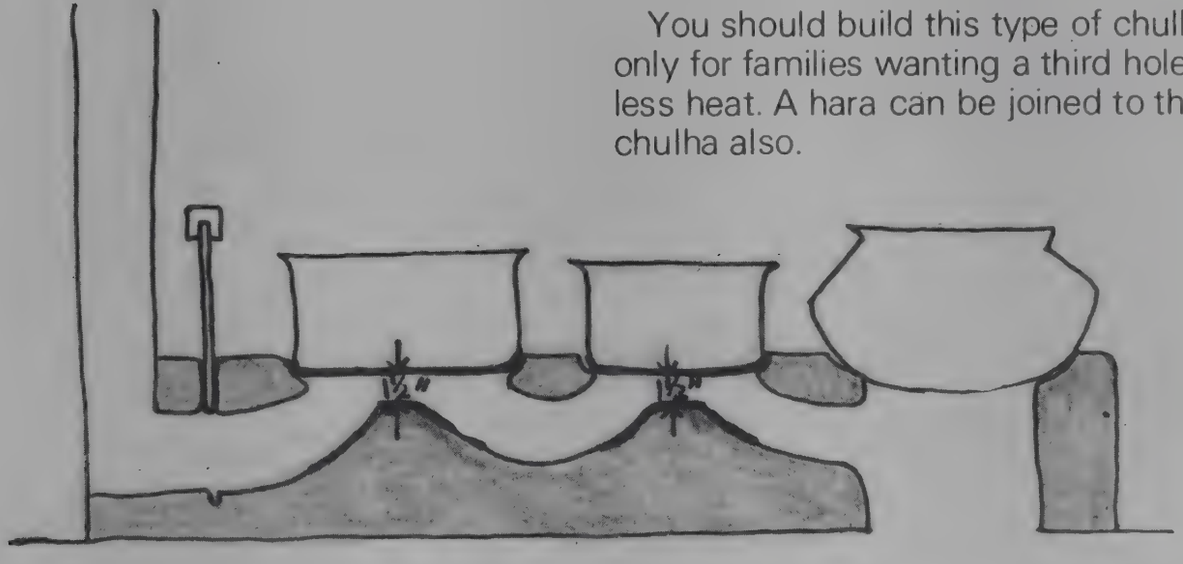
Another old hara connected to a new chulha



4 3-HOLED CHULHA WITH ONE TUNNEL.

This has a longer tunnel between the firebox and the chimney to fit a third hole. The tunnel can be straight, Z or L shaped. The outer shape can be rectangular. square or L shaped. The last hole in this type of chulha gets less heat as the hot gases become less hot on reaching it. You will not be able to cook food on the last hole but it will keep food warm. The longer tunnel also makes the pull of the chimney less. Because of this, you should keep the baffles in the 2nd and 3rd holes lower. The distance between pots and baffles should be 1" (25 mm) to 1½" (38 mm). This means that pots in the 2nd and 3rd holes will get less heat.

You should build this type of chulha only for families wanting a third hole with less heat. A hara can be joined to this chulha also.



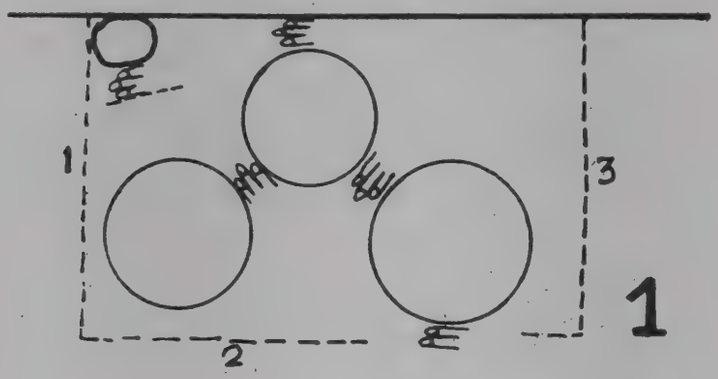
A 3-holed chulha with one tunnel with holes in a line.

A 3-holed chulha with a Z-shaped tunnel.

4.1. Square 3-holed chulha with one tunnel.

Cook's sitting position to right side of firebox or to its left in front of the chulha.

Chimney diameter	:	4 inches (100 mm).
Chimney damper	:	One.
Hole in A.C. chimney	:	Width 4" (100 mm), height 5" (125 mm).
Chaapris	:	8 to 9 of 21" × 7" × ¾" (525" × 175" × 20 mm) size, with one cut into smaller pieces for the tunnel roof.
Gara	:	About 5 taslas.
Dry earth	:	About 4 taslas.



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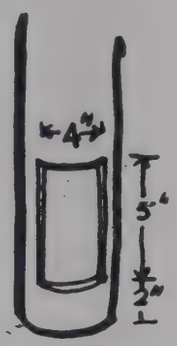
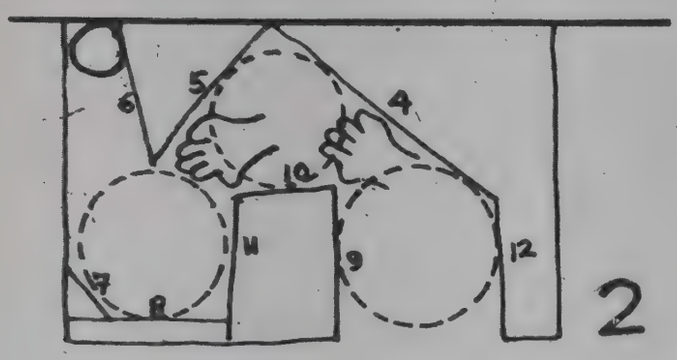


hole cut in chimney.



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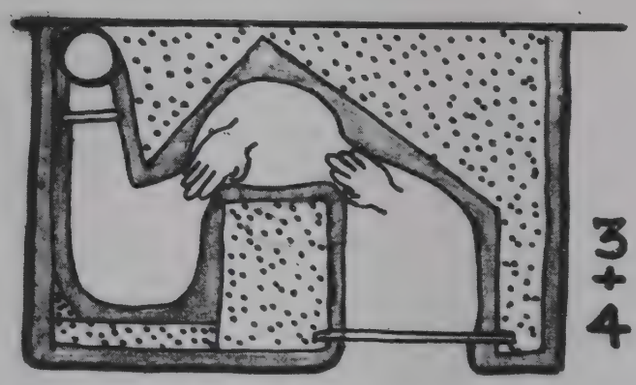

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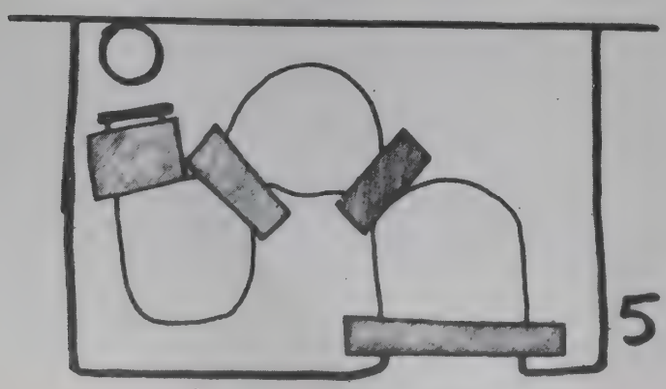

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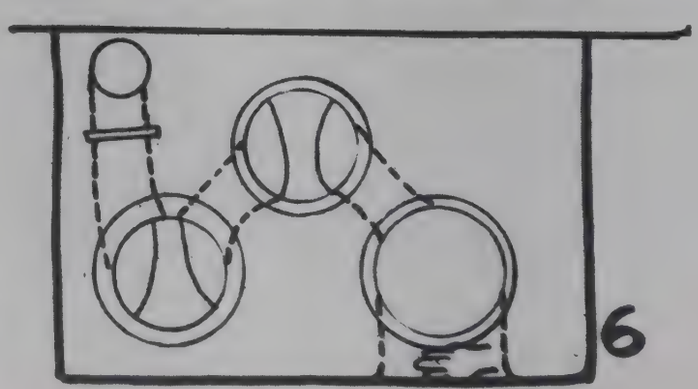

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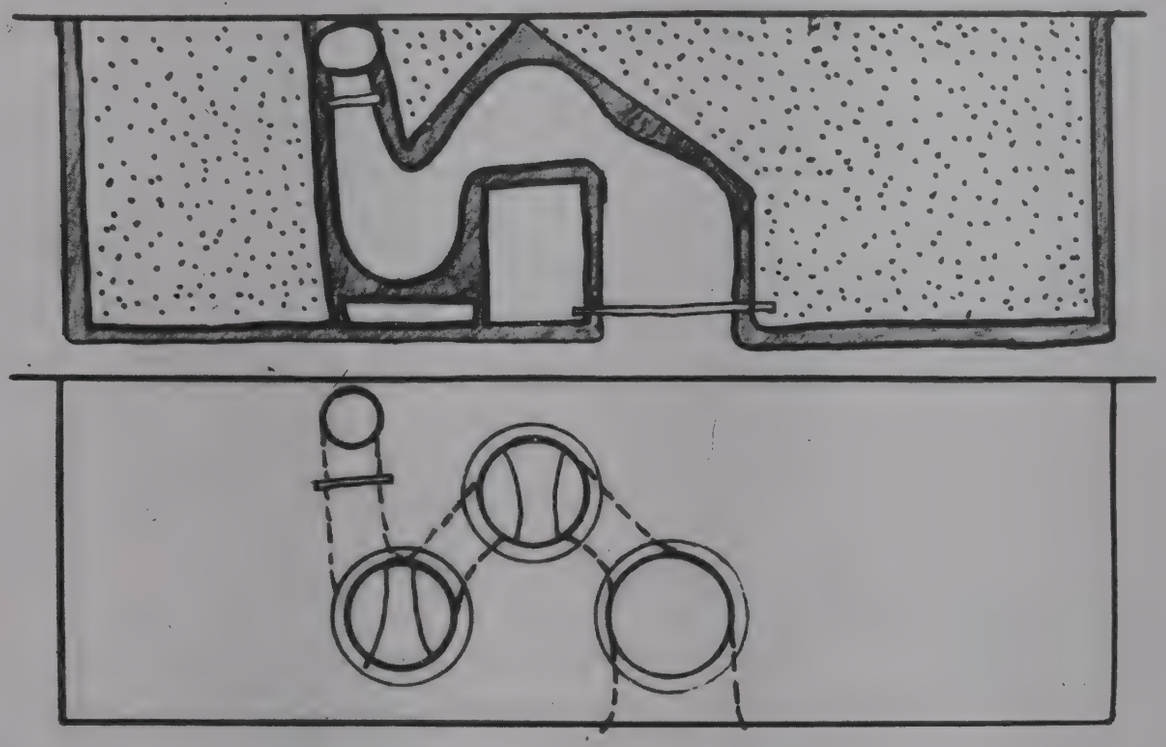
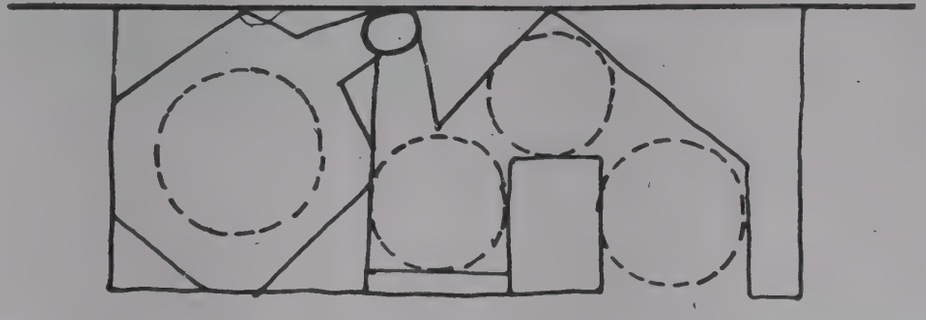
4.2. 3-holed one tunnel chulha with platforms on both sides.

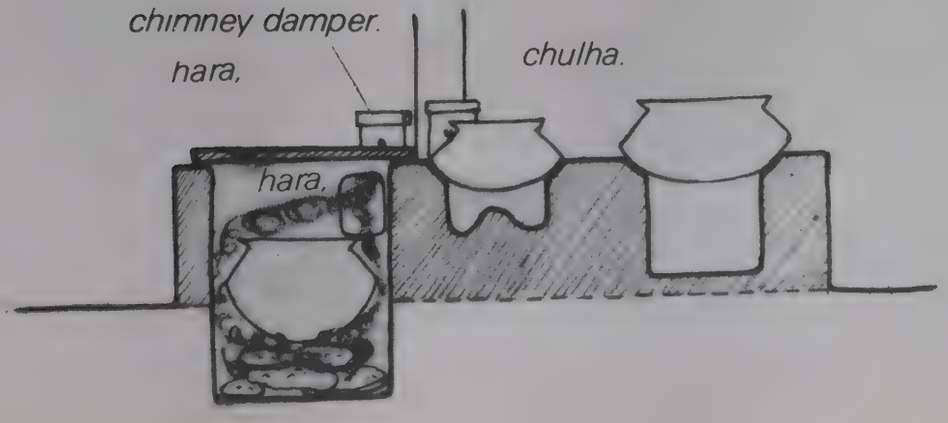
For this you will need more chaapris, gara and dry earth depending on the size of the platforms.



4.3. 3-holed one tunnel chulha with sunk-in hara.

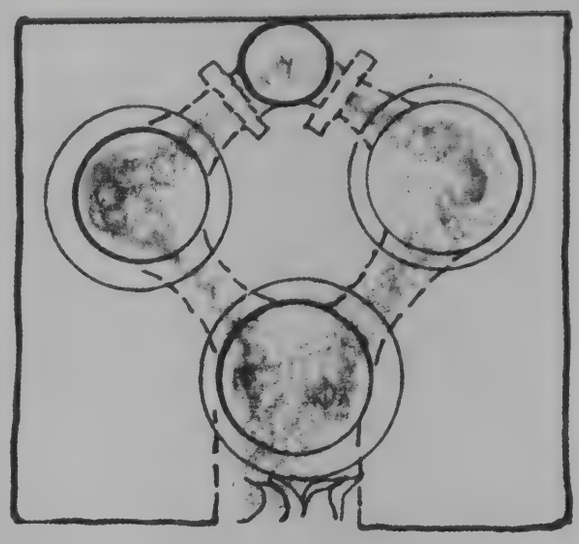
For this also you will need more chaapris and gara and two chimney dampers. One large hole 9" (225 mm) wide and 5" (125 mm) high should be cut if an asbestos cement chimney is used.





5 THREE HOLED CHULHA WITH TWO TUNNELS.

The firebox of this chulha is connected to the chimney with two separate tunnels. Each tunnel has a cooking hole above it. Both tunnels have chimney dampers between the chimney and the second hole. From outside, the chulha can be square or T-shaped.



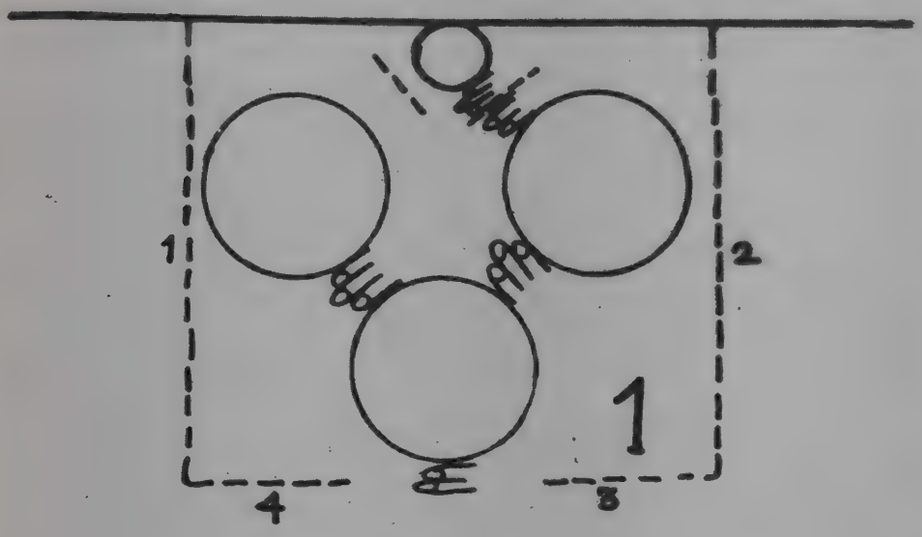
This type of chulha is liked very much in Himachal Pradesh. You can cook food on all the three holes as all of them get almost equal heat. As both tunnels are not very long, the distance between baffles and pots can be only ¾" (20 mm). Users say that they save a lot of fuel with this chulha. They also say that the chulha cooks food much faster. When you want to use only two holes, you can stop heat going to the third one by closing the chimney damper next to it.

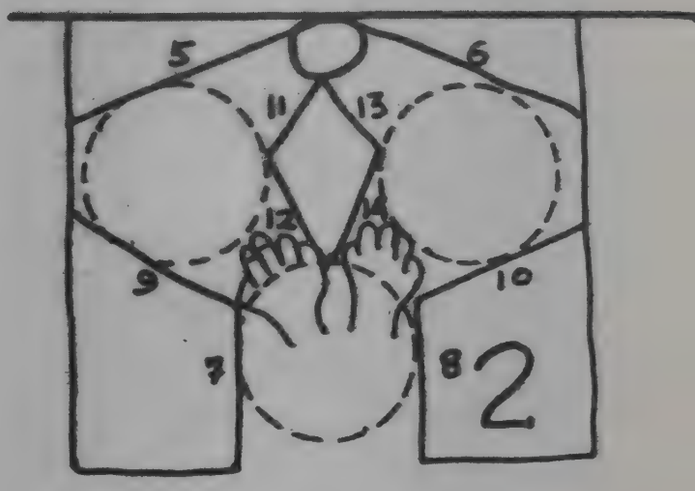
Chimney diameter	:	4 inches (100 mm).
Chimney dampers	:	Two.
Hole size in A.C. chimney.	:	Width 9 inches (225 mm) Height 5 inches (125 mm)
Chaapris, gara and dry earth as for type 4.		

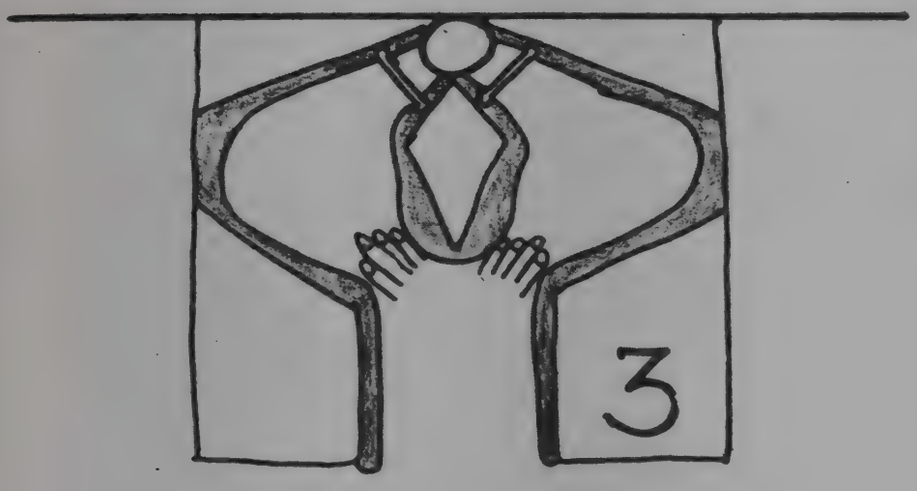
Chaapri layout for a square 3-holed chulha with two tunnels.

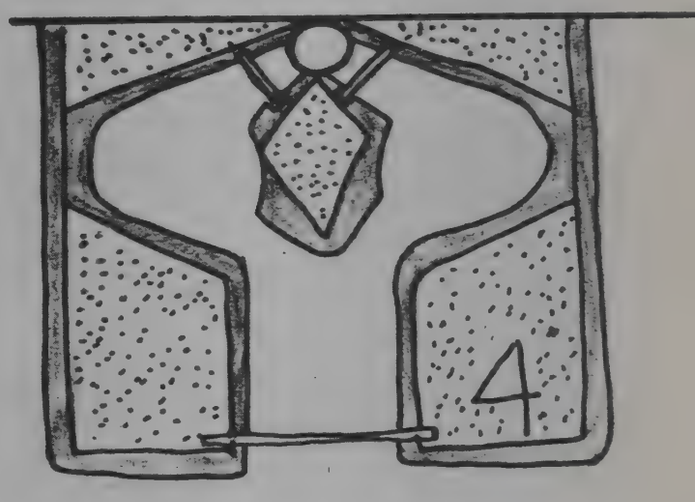
5.1. Three holed chulha with two tunnels, square shaped.

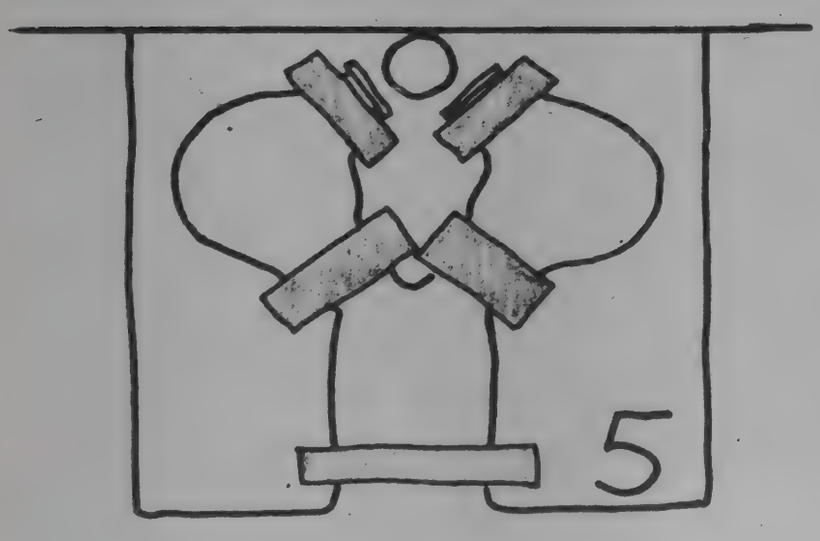
Cook's sitting position to left or right of firebox in front of the chulha

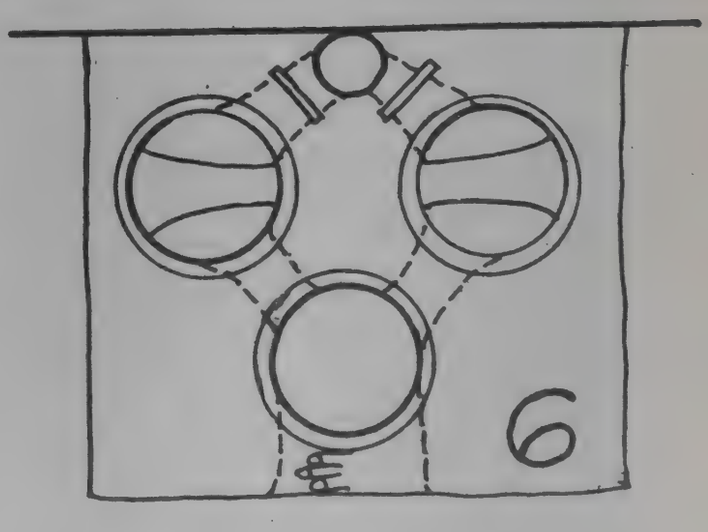




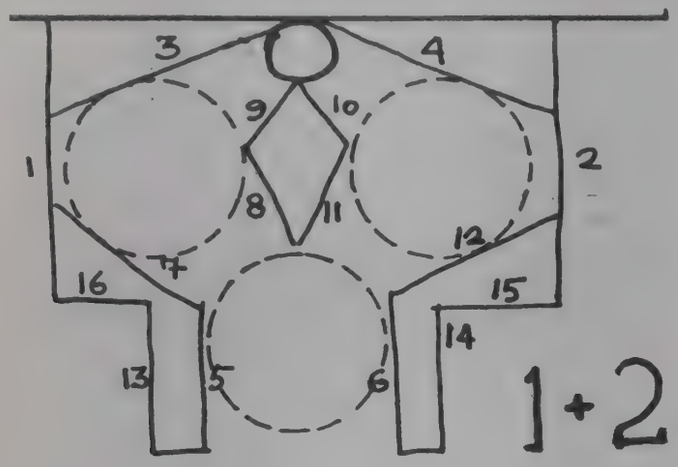


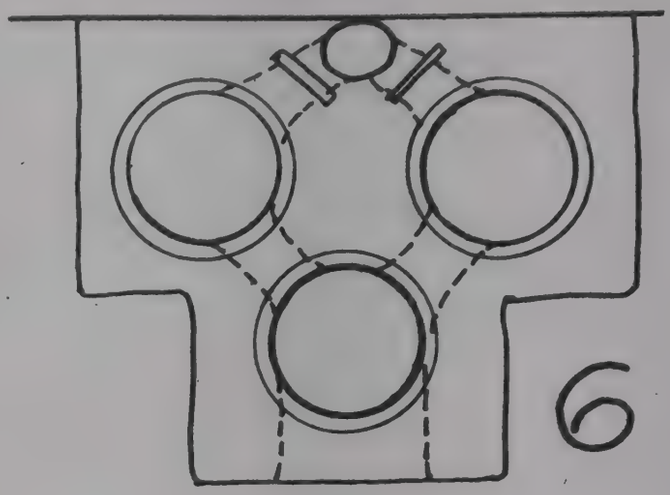






5.2. Three holed chulha with two tunnels T-shaped.





A trainee learning chaapri layout for the chulha.

A chulha in use.

A T-shaped chulha built in an existing fire place.

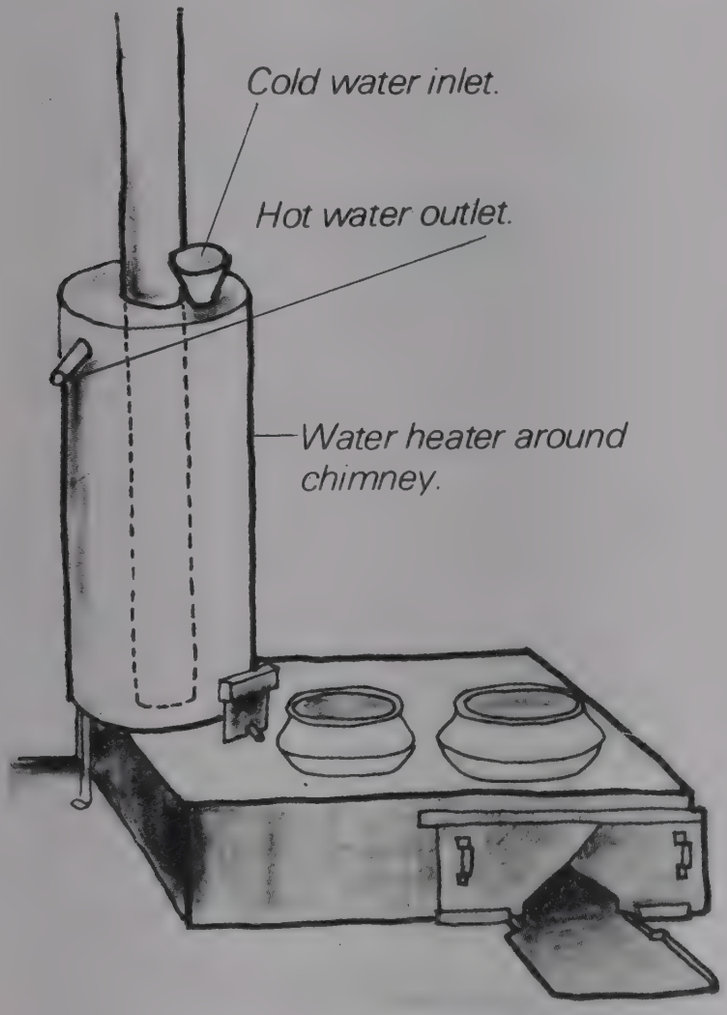
A T-shaped chulha with platforms on both sides.

6. SOME OTHER TYPES OF CHULHAS

6.1. Nada Chulhas with a grate.

It is very easy to fit a grate in the firebox of any Nada Chulha. However, we have built very few Nada Chulhas with grates. This is because many villagers like to bury the fire under ashes when they are not cooking. It is difficult to do this with a grate.

A Nada Chulha with a grate

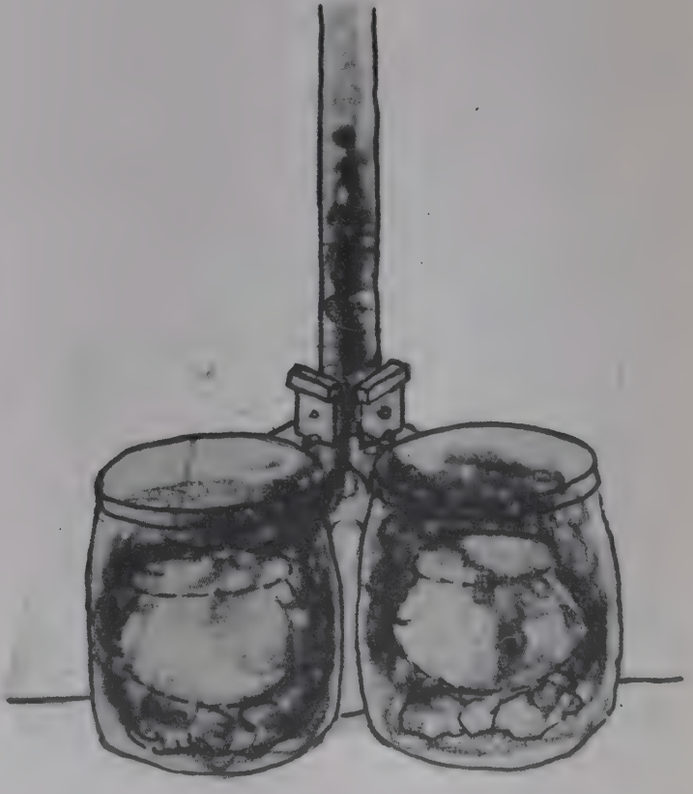


6.2. Water heater joined to the Nada Chulha.

Mr. Vidyarattan, a chulha supervisor of S.W.R.C., Jagjitnagar in Himachal has tried building a metal water heater around the chimney of the chulha. This works quite well. It should be useful for families living in cold mountainous areas.

6.3. Two haras joined to a chimney.

Ms. Urmila Sharma, a chulha supervisor of Haryana S.W.R.C., Nanwan, has built two *haras* joined to a chimney. This also works well and should be useful for families who have a lot of milk.



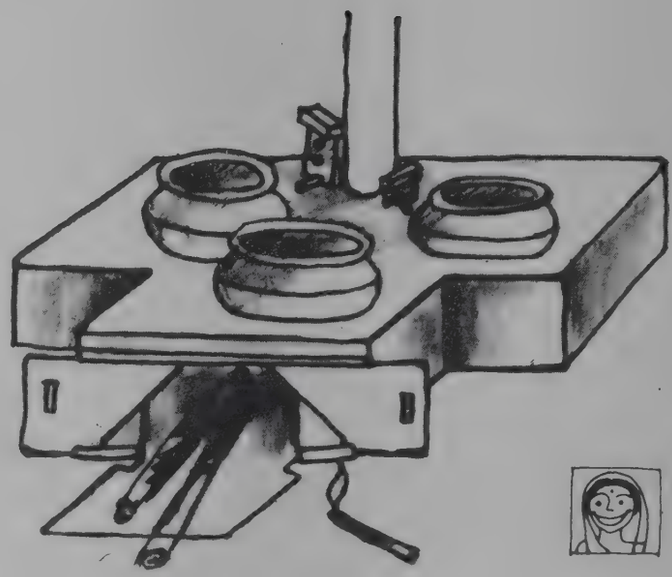
Two haras joined to a chimney.

Chapter 7

HOW TO USE AND MAINTAIN THE NADA CHULHA

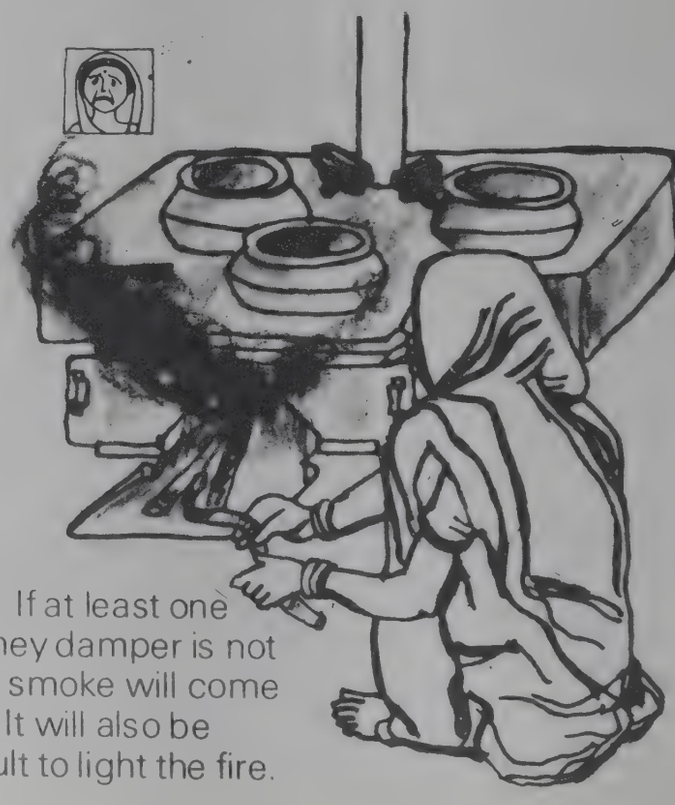
1 DAILY USE

1.1. Make it a habit to take out ashes from the tunnel every morning. The tunnel must be clear upto the bottom of the chimney.



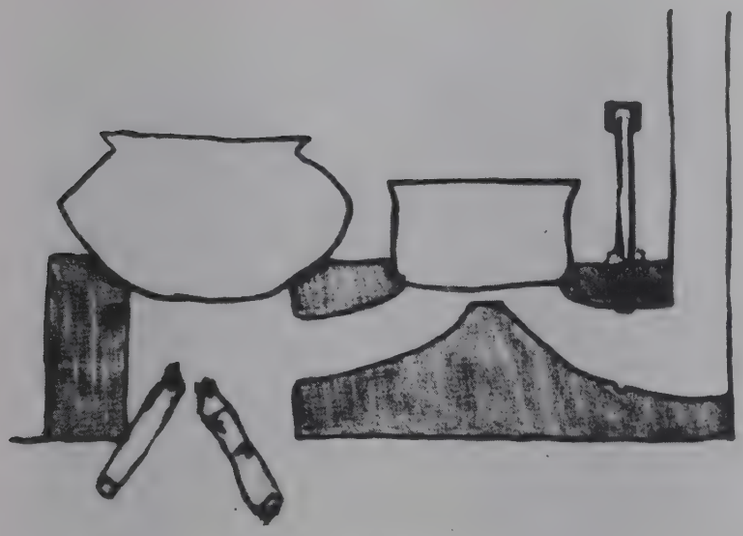
1.2. Before lighting a fire, cover all cooking holes and open the chimney damper and the front dampers.

1.2. If you leave any hole open, smoke will come out of it.



1.4. If at least one chimney damper is not open, smoke will come back. It will also be difficult to light the fire.

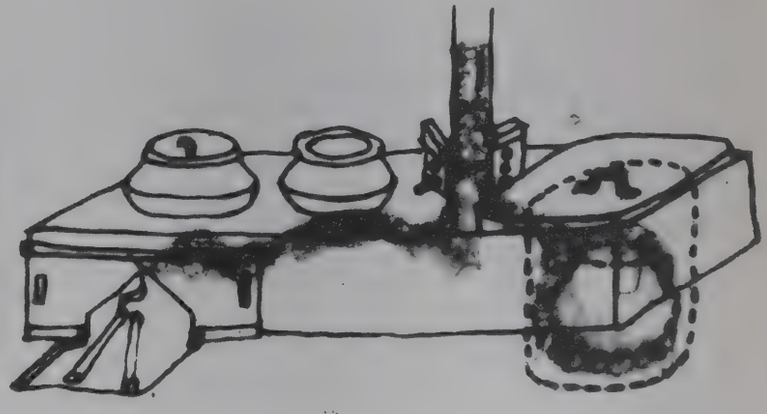
2 HOW TO USE THE CHIMNEY DAMPER.



2.1. The chimney damper helps you to make the pull of the chimney more or less. When it is pulled up, the tunnel is fully open. The chimney can pull in more air. This is why you should keep the chimney damper open when lighting the fire.

2.2. Once the fire is burning nicely, lower the chimney damper till the tunnel is almost closed. If smoke starts coming back, raise the damper just a little. Fix the damper in this position by pushing a stick in the nearest hole in the damper.

If you need a stronger fire, or if the fire stops burning properly, raise the chimney damper



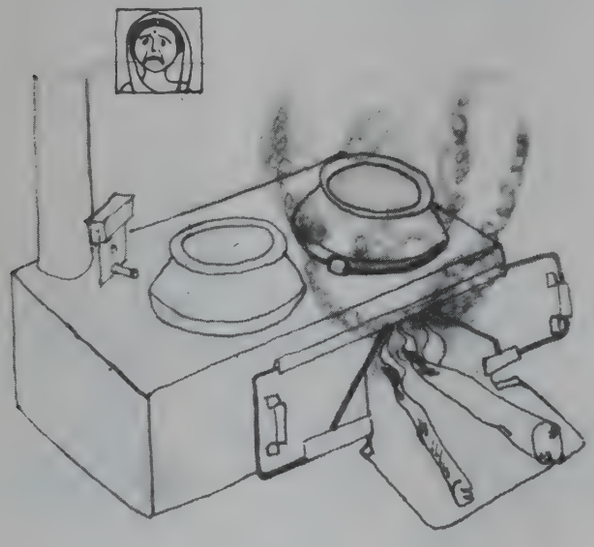
2.3. **A 3-holed chulha with two tunnels** has two chimney dampers. When you need more heat in only two holes, close the chimney damper next to the third hole completely. When you need to cook three things at the same time, open both chimney dampers equally. Set their positions as explained above.

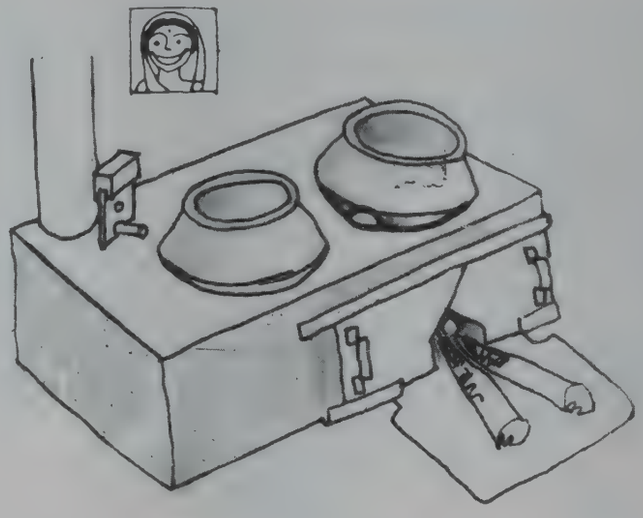
2.4. **A chulha with a hara** also has two chimney dampers. When you are using both the chulha and the hara, open the hara damper completely and set the chulha damper as explained above. When you are using only the chulha, close the hara damper completely. When you are using only the hara, close the chimney damper of the chulha completely.

3 HOW TO USE THE FRONT DAMPERS

3.1. By opening or closing the doors of the front dampers, you can make the mouth of the firebox bigger or smaller. By doing this, you can control the air going to the fire. A slow fire needs less air. A strong fire needs more air.

3.2 When starting a fire, open the front dampers. Once the fire starts burning, close both doors and leave only a small opening for air to come in. With the dampers in this position, the fuel will burn slowly and better. You will also be protected from the heat of the fire in summer





3.3. To understand the effect of the front dampers, try doing this experiment. First start a good fire in the chulha. Then keep a small stone between the first pot and the first hole. Open the front dampers completely. Smoke will start coming out of the gap between the pot and the hole.

3.4. Now close the front dampers almost completely. Smoke will stop coming out of the gap between the pot and hole. This is because less cold air going into the firebox makes the inside temperature more. A higher temperature makes the gases burn better. You get more heat from the same amount of fuel.

4 WHAT SHOULD BE DONE IN-BETWEEN COOKING?

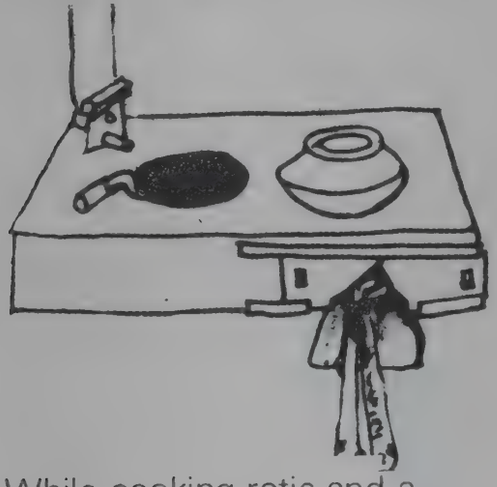
4.1. In between cooking meals, cover all holes, put out unburnt fuelwood and close the chimney damper and the front damper. This will:

—keep the chulha hot for many hours
—keep buried fire alive for many hours
—keep food, milk or water warm for many hours
—keep ashes and sparks inside the chulha
—make it easier to light the fire next time
—save fuel as you will not have to burn fuel to warm cold food.

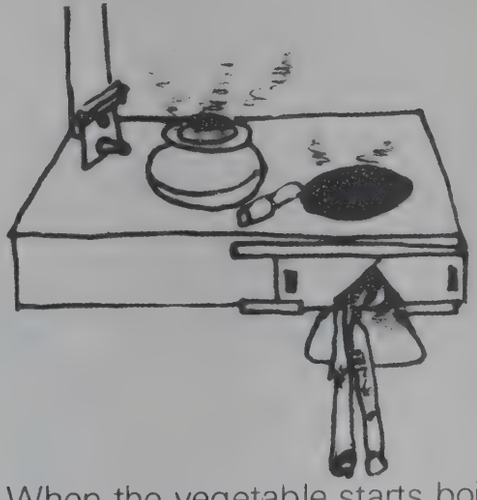
If smoke starts coming out of the chulha, open the chimney damper a little to stop this.

By using the chimney and front dampers properly, you can make the heat of the fire more or less and save fuel.

5 HOW TO SAVE FUEL AND TIME WHILE COOKING



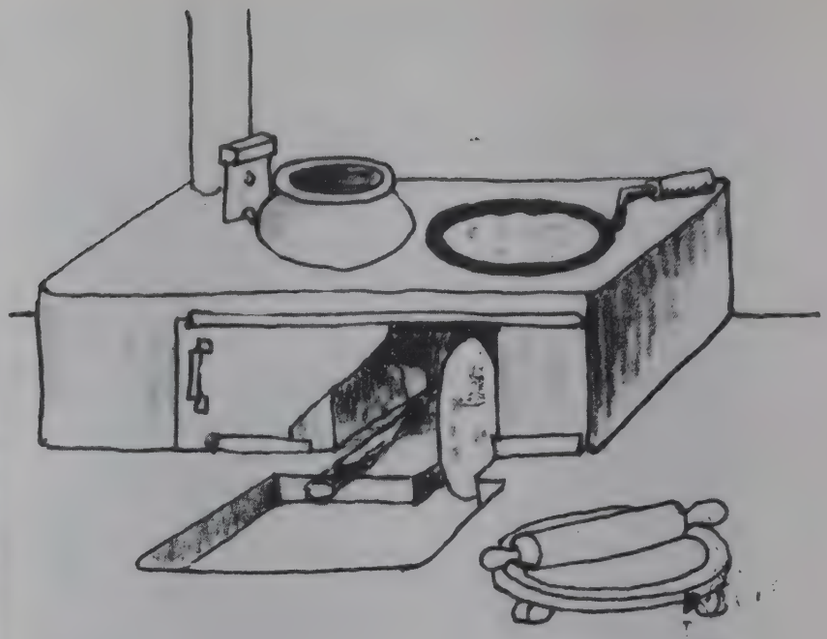
5.1 While cooking rotis and a vegetable, first put the vegetable on the first hole and the tava on the second.



5.2. When the vegetable starts boiling, interchange the tava and pot. This way, by the time you have cooked the rotis, even the vegetable will be ready. Cook rice and vegetable together in the same way.

5.3. Some things take a long time to cook These need a strong fire till they have started boiling. After that they need only enough heat to keep them at boiling temperature. You can save a lot of fuel by making the fire burn slowly at such times. To make the fire burn slowly close both dampers almost fully and take extra fuel out of the fire.

6. HOW TO ROAST ROTIS.



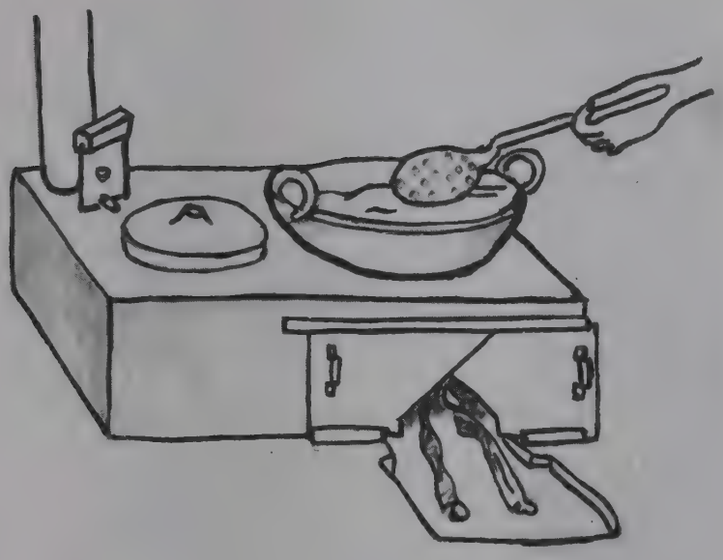
6.1. If you want to roast rotis on the fire take out one door of the front dampers. Stand the roti on the fire on one side of the firebox.

6.2. For roasting large rotis of *bajra* or maize, dig a groove on one side of the firebox floor. Stand the large rotis in this for roasting. When you are not making rotis, fill this groove with ashes.

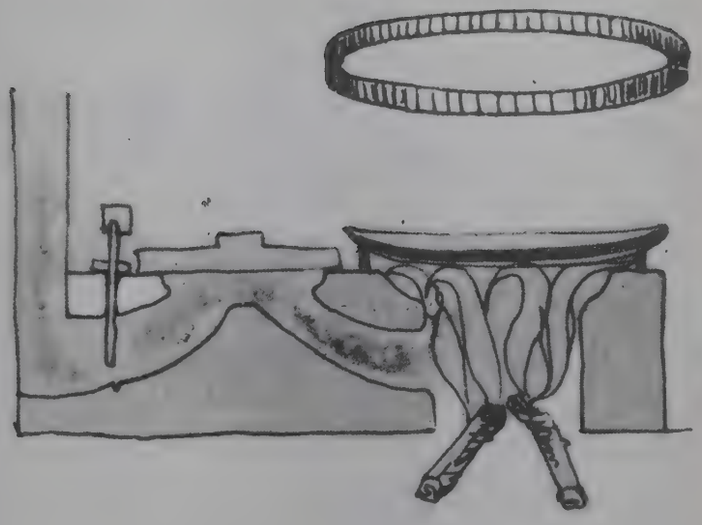
6.3. Or, make the mouth of the firebox higher by cutting some mud from the front edge of the firebox floor. Make the floor slope upwards into the firebox.

Never make the inside height of the firebox more. That will make your chulha burn more fuel and food will cook slowly.

7. HOW TO USE BIG POTS.

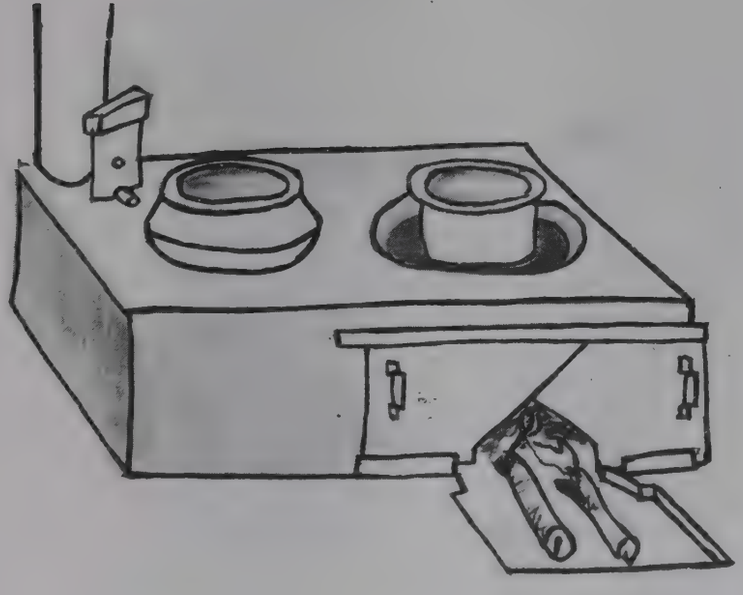


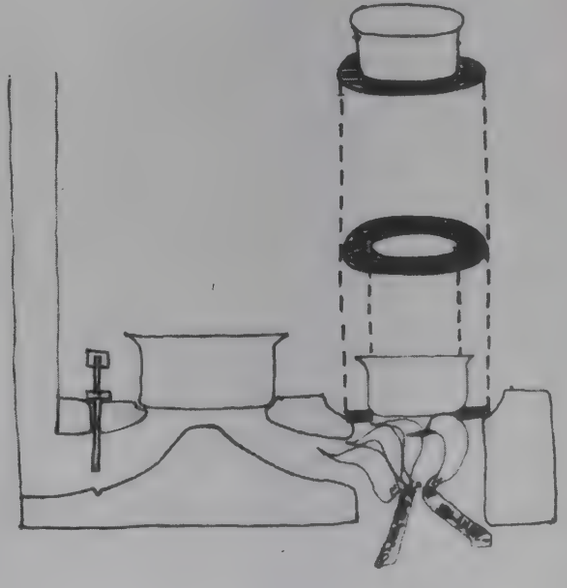
7.1. Your chulha is built for the size of the pots you use everyday. For using a big pot on the first hole, cover the second hole with a flat cover. If you do this, however, cooking might be slow as only a small part of the big pot will get heat from the fire.



7.2. If you need to use a big pot or tava more often, you should get a special ring made. The diameter of the ring should be just a little less than the diameter of the big pot. The height of the ring should be 1-1½" (25-37 mm). Put this ring around the first hole and put the big pot on it. Then your food will cook faster as a bigger part of the pot will get heat from the fire.

8 HOW TO USE VERY SMALL POTS

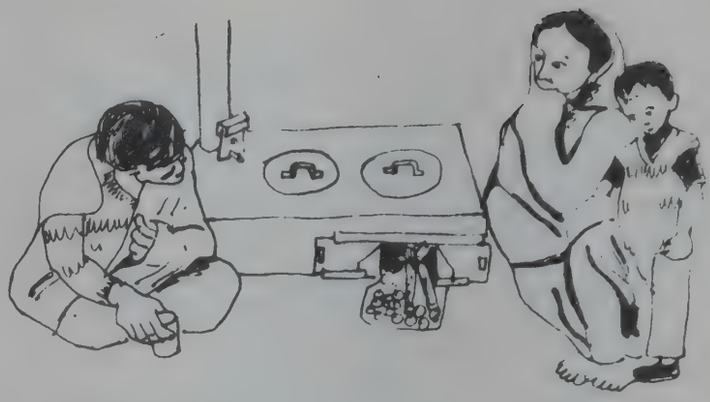




To use a very small pot, as for making one cup of tea, use a ring to make the chulha hole smaller. The ring should be a little bigger than the chulha hole. The hole in the ring should be a little smaller than the small pot.

9 HOW TO KEEP YOURSELF WARM IN WINTER

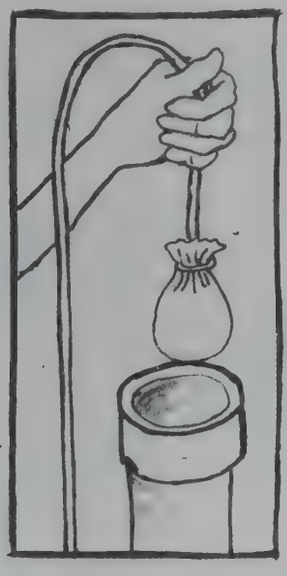
9.1. Use the Nada Chulha like your old chulha. Close the chimney damper, keep the chulha holes open and sit around the chulha fire as before. But your room or kitchen will get filled with smoke.



9.2. If you do not want the smoke, cover the chulha holes and keep the chimney damper a little open. Keep the burning firewood near the chulha mouth and pull the glowing charcoal into the ashpit. The family can keep itself warm with the charcoal.

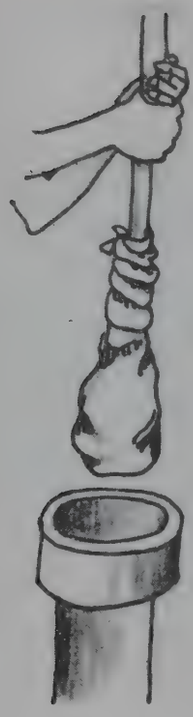
10. HOW TO CLEAN THE CHIMNEY

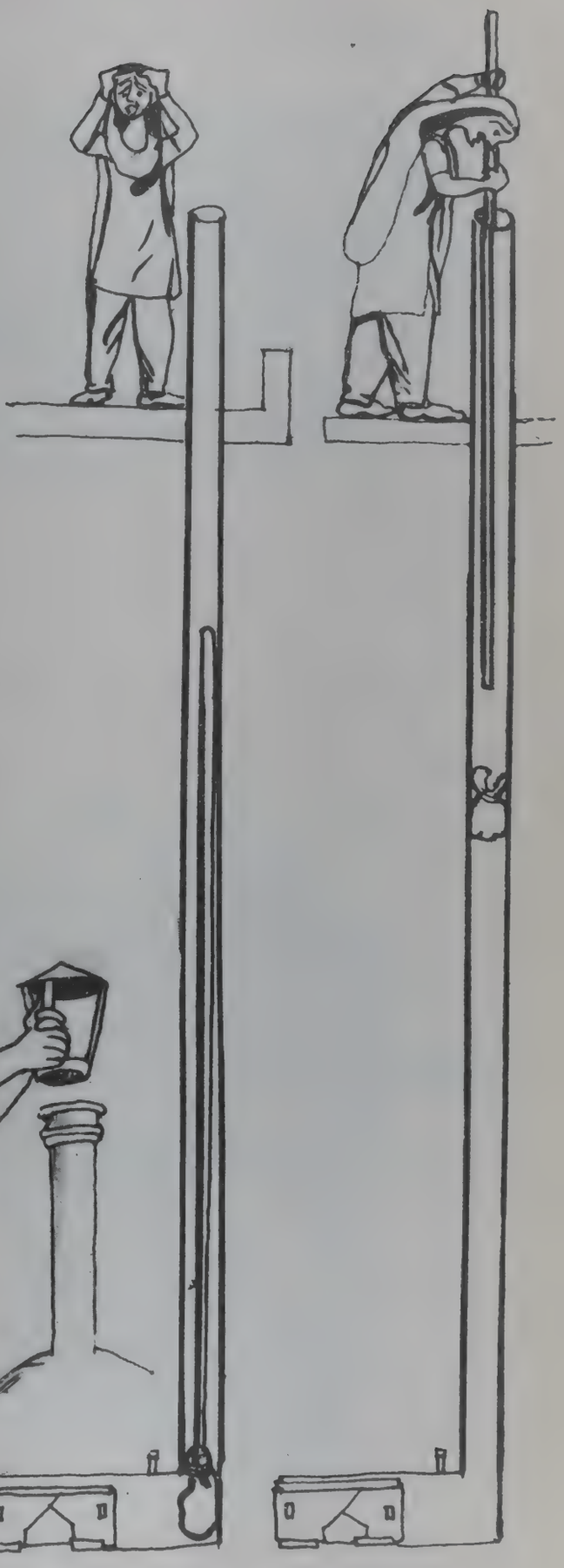
You have to clean the chimney from time to time. You might need to do this once in 15 days to once in two or three months. This depends on how much your chulha is used and which fuels you burn.



10 1. The easiest method of cleaning the chimney is to first tie some sand in a piece of cloth. The sand bag should be small enough to go inside the chimney. Tie this bag to a piece of rope which is longer than your chimney.

Close the chimney damper and lift the cowl. Lower the bag into the chimney and pull it up and down 3 or 4 times. The soot inside the chimney will fall down. Take this out through the last hole by hand or with a karchi.





10.2. You can also clean the chimney by tying a cloth to the end of a long pole. Move this pole up and down the chimney a few times. You might have to use this method if a tar-like thing has got stuck inside your chimney.

But you have to be careful! If the cloth is not tied strongly to the pot, it might get stuck inside the chimney.

Or, if your pole is not long enough, it might slip from your hand and fall inside the chimney. You will have to remove the chimney to take out the pole!

10.3. Remember, you must be able to lift the cowl to clean the chimney.

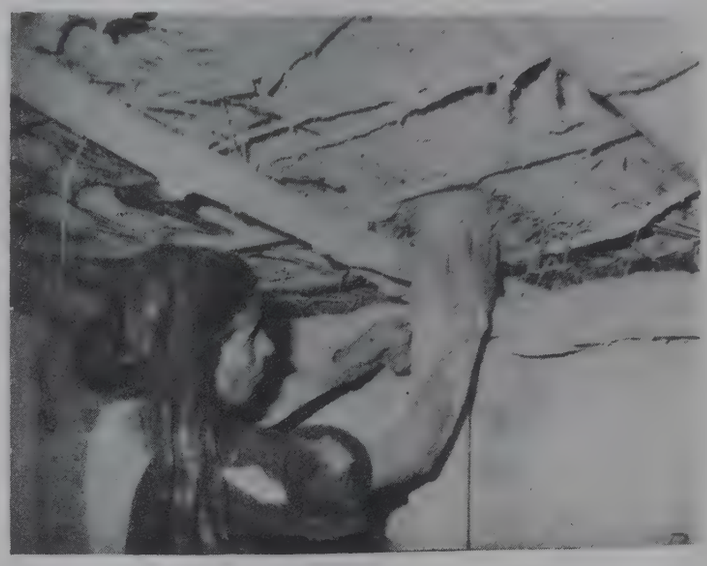
You must clean the chimney from time to time for the chulha to work properly and for smoke to go out.

11. THE CHIMNEY AND THE DANGER OF FIRE

There is less danger of fire with the Nada Chulha than old chulhas. But you should be careful about two things.

11.1. If your kitchen has a thatch roof, you **must** stuff thick gara between the chimney and the thatch (see chapter 5, 1.16). And, you must keep the cowl fitted on the top of the chimney. This will stop any sparks coming out of the chimney from falling on the thatch. You **must** also explain the importance of this to all users of the chulhas you build.

11.2. In cold areas, or where dung cakes are burnt a lot, a tar-like thing gets stuck inside the chimney. This can catch fire and burn at very high temperatures. Cleaning the chimney from time to time is even more important in such chulhas.



12. HOW TO MAINTAIN THE NADA CHULHA.

You can make your chulha last for many years by following a few simple rules.

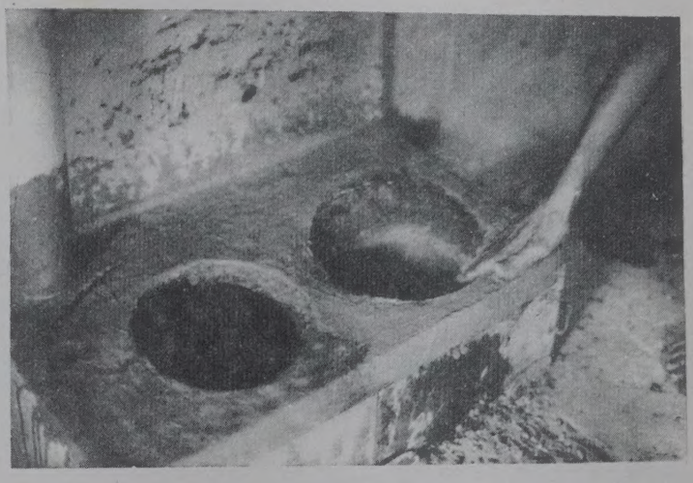
12.1. Let the chulha become fully dry before using it. If you do this, your chulha will become stronger and will not crack.

12.2. Keep giving the chulha regular washes of a thin clay and water mixture. This will keep filling small cracks and not let them get bigger.

12.3. In some areas, women use a dung and clay mixture for giving these washes. This is thicker than a clay and water wash. With time, the height of the chulha becomes more and the chulha holes become smaller. Both make the chulha work badly. You must scrape off the collected layers of dung and clay from time to time. Remove them from the top of the chulha and from the sides of the chulha holes.

13. HOW TO REPAIR THE CHULHA.

A well built chulha will need repair from time to time at only two or three points. These are: i) the roof of the firebox, ii) the edges of the first hole and iii) the inside walls of the firebox. Repair these quickly and do not let them grow. Follow these simple rules while doing repairs.



13.1. Always cool the chulha before repairing it. Gara applied on a hot chulha will fall off quickly.

13.2. Always sprinkle water on the part of the chulha you are going to repair before applying new gara on it. This will make the new gara stick to the chulha better.

13.3. Dig some grooves on the chulha to give the new gara a better hold on it.

13.4. Use quite thin gara for doing small repairs.

13.5. Scrape off all loose clay from the chulha before applying new gara.

13.6. While repairing the inner walls of the firebox, do not make its width, depth or height more than before.

13.7. Do not make the chulha holes smaller while repairing them.

Remember, if you keep doing small repairs side by side, your chulha will last for many years.

Request for your comments, criticisms and ideas:

This book is only a beginning. We want to improve it - with your help.

If you have any suggestions on improving it, please send them to us.

Please let us know which parts of the book you find most useful, and which parts, pages, paragraphs, pictures or diagrams you find confusing, badly written, least useful or incorrect.

We are especially interested in receiving suggestions from village and community workers who have become chulha project supervisors and instructors.

Please write to:

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